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Original Contributions.

HOW TO MAKE GOLD FILLINGS.

BY J. V. CONZETT, D.D.S., DUBUQUE, IOWA.

(Continued from page 942.)

The rubber dam is a necessity in making gold fillings of course. The old operators did get along without it, as they got along without the engine and all of the rest of the splendid accessories to good work that we have today, but they used the non-cohesive gold almost entirely, and cohesive operations did not become successful until the advent of the rubber dam. The large majority of the profession only use the dam for cohesive gold operations now, but while it is essential there, I am a believer in using it for all operations whether for gold in any of its forms, amalgam or cement, and I believe that it is little less than criminal to attempt to treat teeth and fill root canals without its use. I grant that there are certain places and certain conditions which preclude its use, but the rule should be to always use the dam in all treatment cases where at all possible and in most all operations for filling the teeth. And the reason is that in the treatment of teeth it is scarcely possible to make an aseptic operation without the dam, and the same is true of a filling, but I grant that the necessity for asepsis there is not so great. But in the cavity preparation you can better see what you are doing, you can more easily and expeditiously prepare your cavity and you are not filling the patient's mouth with the chips of tooth and debris of decayed tooth substance. But, best of all, your cavity is not constantly filled with saliva and its contained organisms and it is clean from the beginning to the end of the operation, and I cannot help but believe that a tooth filled under aseptic conditions is going to be a better tooth

and a filling made under such conditions is going to be a better filling than one made under saliva and dirt.

The reason men do not use the dam more is because of the difficulty they find in adjusting it. I have seen men work for half an hour trying to adjust a dam that should have been placed in from thirty seconds to a minute, and I do not wonder that they do not use the dam any more than they absolutely have to do. But, really, in the large majority of cases the adjusting of the dam is a simple operation, and if possible I am going to try to tell how it should be done.

In the first place, before the dam is placed, the teeth should be cleaned by syringing about them with an antiseptic wash or, better still, if you have a spraying apparatus, a powerful spray of the solution should be directed upon and between the teeth and under the gingival margin, that any accumulations of debris and infectious material should be washed out and not left in place to be forced under and into the gingival membranes to cause a possible gingivitis. The solution I use is twenty to thirty drops of the oil of Cassia to a pint of water. I have a copper tank that holds about a quart, and a lid that fits over the tank in which are soldered two cone-shaped funnels for the purpose of holding two ordinary rubber-bulb chip blowers; another hole in the lid at the side of the tank allows a dairy thermometer to penetrate the tank and this is held in place by a couple of rings soldered to the side of the tank, one above another, the thermometer slipping down into them. It then projects through the lid above the tank and the temperature of the water is always instantly known. I prefer it to be about 120 degrees Fahrenheit. The water is kept at a constant temperature by the tank being placed upon a bracket over a Welsbach gas burner, the mantle part being entirely removed, leaving only the Bunsen burner and the pilot light. This pilot light is enough to keep the water at the proper temperature and it can be regulated by the set screws in the burner so that it will never be necessary to bother about it at all, but the light can be allowed to burn constantly and you always have a warm antiseptic solution at arm's length. After thoroughly spraying or washing the teeth, go between each tooth with a piece of floss silk or rubber band to remove the debris between the teeth and to be sure that

your dam will go between the teeth. In placing the dam always take in enough teeth. I have seen men trying to operate with two or three teeth sticking through the dam, and the dam, in consequence, was always in the way of the operator and was more of a hindrance than a help. If you are operating upon a bicuspid or molar commence, at least, at the median line with your dam. Do not commence with a cuspid or a bicuspid, but go to the central incisor, at least, and you will do no harm if you go to the lateral incisor on the other side of the mouth. Use dam of medium weight. Thin dam is an abomination, for in a great many cases it will tear just when you don't want it to and if it does not tear it hugs the tooth so loosely that it is constantly leaking. Heavy dam is preferable, but is more difficult to adapt. The medium weight is about right. The holes should not be too large; with the S. S. White dam punch I ordinarily use the third hole for molars and the second hole for bicuspids, cuspids and upper incisors, while the first or smallest hole is used for the lower incisors. Judgment must be exercised in the proper distance to place the holes; if too close the dam will pull away from the tooth and leak, and if too far apart the rubber will wrinkle up between the teeth and be very much in the way of the operation. This must be learned by experience, but after a little practice and a few failures and noting what caused the failure, the eye will be able to gauge the proper distance to a nicety. Do not use too small a piece of dam. Use enough to cover the entire mouth and then some, and have it long enough that it is not constantly slipping up over the lower teeth in operating on the upper teeth or from the upper lip and teeth when operating upon the lower teeth. Such things are an annoyance to patient and operator alike and are a source of danger to your filling. In punching the holes in the dam conform to the curve of the arch, that your dam when placed may lie naturally upon the teeth and cheeks and not be pulled into folds and wrinkles by being forced into holes cut along wrong lines. After the holes are punched in the dam, lubricate them with a perfumed vaselin, soap or cocoa butter, any of which will do. Personally I prefer the vaselin. It is good practice in many instances to also place a little vaselin on the lips and especially in the corners of the mouth, particularly if you are to operate upon one of the posterior teeth,

necessitating some considerable traction upon the lips. If you wish to operate upon a bicuspid or molar commence with the central incisor and go back to the tooth back of the one you are to operate upon, at least. That is, if you are to make a filling in the first bicuspid anchor to the second bicuspid, but preferably to the first molar, etc. First select the clamp that will best fit the tooth that you are to use as your distal anchor, place it in your clamp forceps and have it where you or your assistant can reach it; then grasping the dam between the index fingers and thumbs of both hands and standing at the right side of the patient slip the first hole over the central incisor and progress from tooth to tooth, having your assistant, if necessary, force a piece of floss silk between any teeth that the dam does not slip between easily. Then when you reach the first bicuspid, if on the upper jaw change your position to one directly in front of the patient and proceed until you reach the anchor tooth. Then while you hold the dam in position have your assistant slip the clamp over the tooth or, if you prefer, and I do, have the assistant place the index finger of her left hand upon the lingual surface of the tooth, thus holding the dam where you have placed it, while you reach for the dam forceps and place the clamp yourself. The dam is placed on the lower teeth in the same way, progressing from the central incisors to the anchor teeth and then clamping the anchor tooth and all is done. In placing the rubber dam holders draw them tight enough to take up the folds and wrinkles that would otherwise be very much in the way. I get very much out of patience with men that I see trying to operate with a dam that is a mass of folds and wrinkles in the mouth. These folds are always in the way of the instruments and obstruct the vision. Draw up your dam holders tight enough to pull your dam out of its folds and you can work to so much better advantage. In addition to the regular holder I use an accessory holder that I clasp on the dam below the ordinary holders and then about the patient's neck and on the other side. This prevents the dam sliding up and keeps everything smooth and snug. Do not use many ligatures. It is rarely necessary to use more than one or two at most and most of the time it is not necessary to use any particularly if operating upon the upper teeth. Take a piece of waxed floss silk and going between the teeth therewith turn the

edges of the dam under the gingivæ and it will be all that is usually necessary. But if it is necessary to use one or two ligatures, use them as humanely as possible, for the forcing of a ligature away up under the gum is not the most pleasant thing in the world, and I will warrant that your patient will bless you in proportion as you cease their use. When you expect to use a ligature rub the gums with a little oil of cloves before applying the dam and then when you apply the ligature do not tie a knot and then with an instrument try to force it up under the gingival margin until you have about exhausted the patient, but tie a loop of the floss and then with the curved points of your pliers go between the ligature loop, placing the points of your pliers carefully but firmly as far up as you want your ligature to go, then with the left hand make firm traction upon the loop and it will slip up over the incline made by the curved points of your pliers under the gum, just where you want it, without any pain to your patient and with little trouble to yourself. Instead of the universal use of the ligature, a piece of rubber band slipped in between the teeth and up to the gingival margin will hold the dam in place nicely where it has a tendency to slip off.

After placing the dam, always go over the surfaces of the exposed teeth with a pledget of cotton saturated with alcohol, repeat this several times and dry with a blast of air. This has a double function. It cleanses the field of operation and it removes the oleaginous materials from the surfaces of the teeth and prevents the rubber dam from slipping off. Indeed, so closely does the dam adhere to the teeth after the alcohol bath that it is almost impossible to get the dam off the teeth after the operation without tearing it. One of the nicest things that I have found for cleansing the teeth with the alcohol, and, in fact, for a great many purposes, are pledgets of cotton which my assistant prepares for me by cutting the smallest size Johnson & Johnson cotton rolls into pledgets that are about as long as their diameter.

Having a definite knowledge of the operation we are about to make, knowing the problems that are involved, and having the rubber dam in place, we are now ready for our cavity preparation and we will begin our study of cavity preparation in our next paper.

(To be continued.)

THE PATHOLOGY AND TREATMENT OF EPULIS.

BY CHARLES GREENE CUMSTON, M.D., BOSTON, MASS.

Epulis, originally, and still at the present time, is a purely topographical expression, and has been since antiquity; in fact, I may say, since the time of Galen, applied to tumors of various histologic structure, presenting different appearances and possessors of various prognoses and etiology, and which finally have in common one thing, namely, that they occur upon the gums. More or less pedunculated or assuming the aspect of a mushroom, according to their structure, they may be quite soft, or, on the other hand, tough to the feel, and in color may be light or dark red. The surface is usually irregular. In size epuli differ; occasionally they hang as if suspended from a dental alveolus which is empty, or from a dental fistula; while in other cases they surround a tooth which, from their presence, has become loosened, the latter resulting from an absorption of the bony rim formed by the alveolus and they then transform the mucous membrane which covers the parts into an irregular, degenerating ulcerated surface. Epuli occur also in the form of nodules or infiltrations spreading peripherally or, on the other hand, they may infiltrate the surrounding tissues. Some types of this neoplasm, quite early in their evolution and while still of small dimensions, may cause severe general disturbances due to the hemorrhage to which they give rise and also pain, whereas other examples met with may attain the size of an apple or a closed fist to such an extent that there may be displacement of the neighboring organs accompanied by disfiguration of the face without any disturbances arising in the patient's general condition. As to the prognosis being favorable or unfavorable, it may be said that these growths can be classed both among benign and malignant tumors. Fortunately, the non-malignant type is far in excess of the malignant.

Microscopically, epuli represent the sarcomatous type of growth, through the substance of which one may occassionally find a brownish pigment scattered. The spindle and round celled sarcomatous elements are evident with alternating relationship between the cells and intercellular substance, so that one will meet with tumors of this description possessed of few cells, while those of the softer variety will make known their present by an excessive cell growth.

As Virchow has said, and his description is still good at the present time, sarcomatous epulis, like other periosteal sarcomata, usually has a mixed make-up. Cartilaginous, fibrous, cellular and occasionally mucous elements can be combined in the same growth. Generally speaking, the softer structures predominate and in point of fact, in some instances, the cartilaginous elements are practically wanting. In the softer portions the cells usually become quite large and develop into polynuclear giant cells.

The best classification which we have at present is to divide epuli into the *soft* and *hard* types. In the latter one finds a tough, fibrous tissue, not infrequently containing bony structures, while in the former one is dealing with a soft tissue with cells closely resembling those of the spindle variety of sarcoma.

Giant cells may occur in both types and their number has only a slight affect on the consistency of the growth.

The most evident distinction between the types in their site, and I will not refer here to the interosseous epuli of Nélaton, but only to the periostal form. Like the periostal sarcomata arising in other bones, an epulis may lie directly on the bone on its external aspect, while, in other instances, the jaw may be attacked on its surface and the growth by extension into the bone may destroy the structure of the latter. In those cases where a tooth becomes completely surrounded by the growth, the latter not infrequently penetrates the alveolus, so that it becomes destroyed and the neoplasm represents the alveolar border. This type of epulis, so-called sarcomatous, is what, in the present state of our knowledge, we term epulis, and in this paper I shall confine my remarks entirely to this form.

Characteristic of epulis is the enormous amount of giant cells present in the growth, although in this respect they vary from one tumor to another, but, for all that, they represent such an integral and characteristic element of the tumor that Virchow substituted the term sarcoma gigans to cellularulare for the term epulis. Several authorities have described giant cells as being a specific character of epulis and, according to Virchow, there is hardly another type of growth where giant cells appear in such number and represent the same peculiar size and shapes as in the neoplasm under discussion. They sometimes are present as large, branched cells, at other times polypous, and in such numbers that the principal mass

of the tumor is composed of them. They are delicately granulated, protoplasmic formations, containing a rather large number of equally large, oval nuclei, irregularly distributed and not infrequently crowded together in the midst of the body of the cell.

According to Ribbert, the protoplasm frequently contains many vacuolæ. Following Hausemann's classification, these giant cells closely resemble the myeloplax type, thus contrasting to the parenchymatous and foreign body giant cells, which, by their different shaped and sized nuclei, with their tendency to peripheral localization, are characterized by regressive metamorphosis, or central necrosis of the cell protoplasm, they resemble those which are frequently met with in the physiologic or inflammatory growths of the osteoplastic tissue, such as is encountered in resorption processes occuring in the bones and known as osteoclasts, or as are found in normal red bone marrow under the term of myeloplactes. I would point out in this respect that it has been taken for granted that the presence of giant cells indicated a destructive type of bone marrow cells.

The presence of these cells in excess in epulis could, as far as their being of a myelogenous nature is concerned, be quite probable, because they might be an indication of a certain tendency in evolution of the neoplastic tissue towards the normal anatomic makeup of the original tissue.

It is quite evident that these cells should only be encountered in neoplasms arising from the bone marrow, and it is quite incomprehensible why they should occur so profusely in a purely periosteal sarcoma.

Virchow, who first studied the periosteal origin of the greater number of epuli, endeavored to explain this relation by the hypothesis that the giant cells are not hyperplastic, but heteroplastic elements, which may be encountered otherwise than in the bone marrow. However, this theory assumes that an epulis is malignant, a fact distinctly contrary to what is found in practice, because this growth is far more frequently of a benign nature.

Besides this theory upholding that the cells of bone marrow are the source of origin of the giant cells, there are still most varied conjectures as to the origin of the growth under consideration. In spite of the fact that certain authorities consider that the origin of giant cells is the result of a cell degeneration, others

believe that it would indicate a particularly favorable condition of the nutrition, resulting in an unusual growth of the cells, while still others contend that the origin of the giant cell is to be found in leucocytes, epithelial and intercellular tissues, the endothelium of the blood vessels, lymphatics and lacteal canals. Other pathologists believe that the giant cells have several origins, while still others believe that they may arise from all the above-mentioned elements. A few have been unable from their studies to exclude with certainty any one of the above-mentioned origins.

On account of the hypothesis which I have already mentioned, namely, that the giant cells are products of the blood vessels or lymphatics, or are derived from the blood cells themselves, Carl Ritter took into account the blood contents in epulis, which is profuse, and endeavored to retain it at the time the growth was removed. In this he succeeded without any difficulty in operating on a circumscribed epulis which was easily removed by a gouge forceps and immediately placed in a formalin solution, and, after hardening, it was properly treated for microscopic examination. This examination revealed to him the interesting information, namely, that the giant cells in this particular specimen of epulis were not independent elements, such as are found in the bone marrow, but were present in the form of buds arising from the vessels, whose endothelium extended directly into the protoplasm of the giant cells. This was shown by the shape of the latter, their polypous intermingling, their misshapen contours and especially their evident connection with the tissue of the vessels and their direct passage into the capillaries. Besides this, he claims to have found that the giant cells of the epulis, by direct transformation of their protoplasm, might form bone and again could be changed back into their original form by calcification. From this fact he is of the opinion that he has found an explanation for Koelliker's theory, namely, that the osteoclasts are transformed into osteoblasts, and still more, for Pommer's and Wagner's opinions that the osteoclasts may become spindle cell, fibrous tissue producing cells and, lastly, for Pommer's theory, who endeavored to demonstrate in one section of bone osteoclasts with lacunæ, representing a process of resorption and an apposition process.

The main tissue is composed of spindle cells or of round cells, occasionally both elements being found together, but usually the

spindle-cell type alone is evident. According to Ritter, these spindle cells are not infrequently directly connected with the giant cells and they may be in direct connection with the capillaries, so that he comes to the natural conclusion that the tissue composed of spindle cells also originates from vascular tissues. He also strengthens the theory that the spindle cells are arranged in a manner typical of sarcomatous tissue, in closely approximated parallel strands, only where there is no blood supply, but where this did occur a distinct wall or offshoots could be found with very minute capillary ramifications. I would point out, however, that these studies require further confirmation. The round-cell sarcomata are softer in consistency and contain various sized round or oval cells possessed of a scant protoplasm, a more or less granulated nucleus containing much chromatin, contrary to the spindle-cell sarcoma, whose cells present oval or distinctly spindle-shaped nuclei.

As to the intercellular substance, it is almost completely wanting in the large-celled, soft types of epulis, while the small-celled type it occurs in a fibrillar or finely granular form.

The pigment is arranged in various-sized single foci, which, the larger they are, take on a darker yellow-brownish hue. Usually several agglomerations lie in close proximity, thus appearing as a rounded, sometimes oval or spindle-shaped cell formation, in which, according to Ritter, there is almost always a nucleus. It cannot be ascertained whether these nests are independent or whether the pigment lies within the spindle cells composing the tissue. Generally they are in close proximity to the mucous membrane, directly beneath the epithelium. In the deeper portions of the growth they are only found in small quantities and in a diffuse manner. At those spots which are supplied with an unusually large amount, the giant cells are few in number, or they may be completely wanting. At any rate, the latter when they are present in a mass of pigment are always free from the same. The reaction with ammonium sulphid stains the pigment a deep black and, therefore, it is evident that it contains iron.

Microscopically, an epulis appears, as I have already mentioned, as a circumscribed tumor of varying consistency, but which usually is soft and, generally speaking, is covered by mucous membrane.

The mucous membrane covering it is not usually normal when the case comes under observation. Sometimes there are superficial

ulcerations, due to pressure on the growth, but more particularly as the result of traumatism from the teeth. The growth protrudes as a mushroom-shaped neoplasm from the border of the alveolus, starting usually from its anterior convex aspect and the septum interalveolaria. In very rare cases the growth may be met with on the posterior concave aspect of the alveolar process, but I would repeat, this is most infrequent. The assertion made by Ritter that an epulis never occurs anteriorly in the region of the incisor teeth, but only on the one or the other side, I must take issue to, because not long ago I operated on a case where the growth was arising from the anterior surface of the alveolar process of the upper jaw. The history is briefly as follows: The patient was a child five years of age. A few weeks before coming under observation, the mother noticed that the upper incisors were in a bad condition; these were removed and shortly afterwards a swelling was observed above. This was incised by the family physician, only resulting in giving issue to a considerable amount of blood. When the patient came under observation the four upper incisors were missing and above, developing from the border of the alveolar process, was seen a neoplasm the size of an olive seed, having a smooth surface, of a reddish brown hue, in consistency soft, and bleeding easily upon palpation. On the lower half of the growth the mucous membrane was wanting. The growth extended from the edge of the gums upwards to about three centimeters and was situated exactly in the median line on the convex portion of the alveolar process. There was no swelling on the sides of the growth. Under narcosis the tumor was removed by carefully chiseling off a portion of the alveolar process, including the healthy structures. An iodoform gauze tampon was held in place in the wound. The latter granulated rapidly and the patient was discharged a week later. Microscopically, a diagnosis of sarcomatous epulis was made. Many giant cells were present.

In mentioning this case I do not wish to have it understood that I believe that this is any local predilection for epulis, neither can I imagine why the upper or lower jaw, or, for that matter, any particular portion of the alveolar process, should be a more favorable site for the development of the neoplasm under consideration. From statistics it would appear, however, that epuli are somewhat more frequent on the upper jaw than on the lower, but, as we all know,

statistics are deceitful and this may merely be an accidental occurrence, not true in reality.

The color of epuli is usually quite characteristic, namely, wine color, bluish to brownish red, and may resemble quite closely splenic tissue, and this is probably due to the large number of blood vessels nourishing the growth, but it may also be the result of the brownish pigment which is so frequently present in these growths.

Epuli hardly ever give rise to subjective symptoms, other than that they cause a disfiguration when they attain a very large size and produce difficulty in closing the mouth, chewing and the articulation of speech. They, however, may become of serious import when they have a decided tendency towards the occurrence of hemorrhage.

Epuli rarely extend towards the bone canal and into the marrow, but occasionally the growth extends along the submucous connective tissue on the convex and concave border of the alveolus, usually involving the periosteum of the fibrous layer in the alveolus, as well as the alveolar ligament. The dental cement can, in this case, be also classified as periosteum. Magitot has in the past conclusively shown that epuli usually originate from the periosteum of the alveolus and for some time remain concealed in the depths of the alveolus underneath the teeth and in this way they may give rise to extremely painful symptoms. The intraalveolar neoplasm not being exposed until the tooth is extracted, the growth may sometimes be removed along with the tooth and in this case will be found connected with the root. If such a tooth is allowed to remain in the alveolus, then, as naturally would happen from the continuation of the growth of the tumor, the latter will be pushed up in front of the tooth, this being accompanied by a gradual disappearance of the surrounding osseus tissue and it may appear as though the growth had arisen from the bone itself.

An epulis may occur at any age, but I am led to believe that it is more common during the period of the second dentition, in other words, that period during which the process of formation of definite alveoli takes place, and more particularly during increased plastic processes on the edge of the jaws. However, there is no doubt, as many eminent authorities have pointed out, that epuli may occur with considerable frequency between the ages of thirty and forty years. After the age of fifty the disease is not common,

but I would point that there appears to be a decided predilection for its occurance in the females, and Windmüller states in his contribution to this subject that, out of 41 cases of epulis, 34 arose in female and only 7 in male patients. This practically represents the experience of most surgeons. This evident preference of epulis for the female sex, especially in women of mature age or during the period of pregnancy, has been pointed out by various writers, and I can corroborate it by my personal experience.

Irritating bodies, principally the irritation resulting from contact of carious teeth, roots or fragments of roots, are not infrequently given as etiologic factors in the development of this affection, a condition of affairs which, to my mind, is absolutely contrary to the theory of the congenital etiology of neoplasms, a fact to which attention has already been called by many writers. In these cases one may certainly elicit a history of bad teeth or of traumatism, and in one case I was able to discover the presence of repeated irritation due to cleansing of teeth with a pin, but I am rather pessimistic as to really how much the formation of the growth can be attributed to this habit.

It may be surmised that in such cases the primary cause of the neoplastic formation must be in an inflammatory process produced by the affects of a foreign body, in which case the blastomatosa would react against the irritation.

Beside types of external irritants, certain disturbances in the general health or local conditions may act favorably for the development of epulis, particularly pregnancy and the period of growth. It is of frequent occurrence to note the coincidence of epulis and pregnancy, likewise lactation. Not infrequently small epuli which have been present for a number of years take on a very rapid growth directly after conception has taken place. A marked increase in the size of the tumor occurs during pregnancy, and in this way these neoplasms react like uterine myomata.

As to the prognosis of epulis it should be noticed first that a spontaneous recovery is of extreme rarity, although one or two instances have been recorded, but in all probability these cases were not true epulis and, at any rate, a certain amount of doubt is permissible.

Generally speaking, epulis is characterized by its *local* malignancy, which is made evident by the extension of the growth into the sur-

rounding tissues and its great power of recurring when improperly removed. It is of general knowledge that an epulis when superficially removed will recur and that the recurrence takes on a more rapid course than did the development of the original growth. As a general rule recurrence takes place when, during extirpation of the growth, a certain portion of the jaw bone is not removed along with it, and, according to certain authorities, the danger lies in leaving behind the alveolar process, while in the experience of others, the extraction of the corresponding teeth should be resorted to, because upon this lies the spontaneous absorption of the alveoli, even when the extirpation of the growth has been superficial and this, according to some, is sufficient to prevent a recurrence. In cases of the intraalveolar type, extraction of the diseased tooth is alone sufficient to obtain a permanent cure.

When the epulis is still small and is caused by the presence of a fragment of a tooth, it can be made to disappear in some cases by removal of the irritant, such, for instance, as a carious root. In general, however, a merely superficial removal of the periosteum is not sufficient when extirpation is required, because, as already pointed out, recurrence is practically sure to take place if the underlying bony structures are not removed along with the growth. The loose or carious teeth should be first extracted as well as the healthy ones, which, by their position, impede or prevent the removal of the required amount of bone. An incision is then made over the concave and convex aspect of the jaw and these are united by two horizontal incisions, these extending across the border of the maxillary. The mucosa is then pushed off the bone to a sufficient extent, the growth is incised along with the underlying bone and a few centimeters of healthy structure surrounding the tumor. The gouge forceps are the easiest to use for the purpose. The hemorrhage, which in some cases is quite profuse, is easily controlled by gauze plugging, or the local application of adrenalin chlorid.

The prognosis of epulis is favorable, inasmuch as metastases do not occur, excepting in very few cases, and even these which appear to have developed in the lymphatic glands are rather doubtful. Epuli are malignant merely on account of their aptitude to recurrence and the rapid development of the recurrence when this does take place. But these are instances where the growth was at the

first operation removed superficially and the surrounding and underlying healthy structures had not been removed to a certain extent at the same time. However, in consulting statistics, one will find only a comparatively small number of recurrences and out of sixty-eight cases that were operated on I only find five in which recurrence took place. In all of these successful cases the healthy tissue surrounding the growth and the underlying bony structures were removed with the neoplasm.

As to the differential diagnosis of epulis, it may be said that all neoplasms must be considered which are located on the border of the alveolar process. Among the non-malignant neoplasms are small tumors, which have been termed epilus simplex, or fibromatosa, and which sometimes originate from the gums surrounding carious teeth, sometimes from the dental pulp and also following the extraction of teeth and thus arise from the empty alveolus. They are composed of connective tissue richly supplied with round cells and blood vessels. In most instances they are thin, pedunculated, granulation tumors, having a smooth surface and of a lighter color than sarcomatous epulis. Their attachment is in close proximity to the diseased tooth and sometimes may exactly fit the carious cavity, completely filling it, or they may protrude out of the pulp cavity in the form of pedunculated pulp polypi. Their clinical significance is slight and merely rests upon the small hemorrhages to which they may give rise during chewing and so forth. They can easily be removed by scissors, but are prone to recur readily as long as the morbid cause, namely, the decayed tooth, is not extracted. If this is done, the growth is usually torn off at the same time, otherwise they shrink up and atrophy after extraction of the tooth.

We must also consider those tumors which have as a starting point the periosteum of the alveolar process and interalveolar spaces. These growths are naturally diagnosed by their location in the bone and firm consistency. As long as they remain surrounded by the bone, it is quite hard to differentiate them from chondromata and osteomata. If, however, the tumor has broken through the protecting bone covering, the fibroma will then be characterized by its smooth surface, the chondroma by its nodular feel and the osteoma by its great hardness.

However, the differential diagnosis of these various growths is in practice of slight importance, because the treatment is always

the same, namely extirpation. From the prognostic point of view they are benign, excepting that the larger fibromata may sometimes have a tendency to recur after removal and the recurrence may sometimes be found to have taken on a sarcomatous transformation.

Among the non-malignant neoplasms, which arise on the border of the alveolus, may be mentioned myxomata, cysadenomata and cysts due to the echinococcus and actinomycosis, besides dentigerous cysts and syphilitic growths. To enter into the differential diagnosis of these, it would carry me much too far beyond the limits of this paper, but it may be said that, as compared to the above-mentioned non-malignant growths, the frequency of malignant neoplasms arising on the alveolar border is far less.

When the growth is malignant it may be either a small, round-celled sarcoma, but occasionally it may present a carcinomatous structure. As those growths are no longer classified among epuli, it is out of the province of this paper to discuss them here, but in closing, I would say that severe subjective symptoms and early granular involvement are pathognomonic of them and consequently of great importance in differentiating them from epuli.

MIXED NARCOSIS.

BY JAMES T. GWATHMEY, M. D., NEW YORK CITY. REPRINTED BY COURTESY OF THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION.

In 1774 Priestly discovered nitrous oxid gas and oxygen. It was one hundred years later before the medical world accepted the fact that it was possible to improve the anesthetic by combining the two gases. It is only within the last ten years that the real anesthetic properties of nitrous oxid gas have been generally acknowledged. While it is entirely satisfactory to partially asphyxiate the patient for the extraction of a tooth, and also perfectly safe, it is neither satisfactory nor safe to use this asphyxial method for prolonged surgical operations.

Hewitt, of London, within recent years discovered that a continual narcosis could be maintained by giving a definite mixture of the nitrous oxid gas with 14 to 18 per cent of air for men and 18 to 22 per cent of air for women. This is satisfactory, provided

the mixture of air does not exceed 30 per cent. This is usually accomplished by anesthetists, who have not the necessary apparatus, by giving alternately nitrous oxid and air, with any of the inhalers now on the market, in the following manner: Two to 5 breaths nitrous oxid to one of air, according to the patient and the depth of anesthesia desired.

A more satisfactory manner of giving air and gas is with an arrangement of my own. By turning a small stopcock marked "air" from 10 to 30, backward and forward, the proper degree of anesthesia can readily be determined and satisfactorily maintained. The objection to using air is that it contains a large percentage of nitrogen, which is useless for anesthetic purposes. By the administration of oxygen this useless nitrogen can be replaced by an equal amount of useful nitrous oxid gas. Cyanosis and stertor are thus prevented in a large number of cases.

Dr. Hewitt illustrates this in the following manner: A mixture of 40 per cent of air and 60 per cent of nitrous oxid would contain about 8 per cent of oxygen and 32 per cent of nitrogen, and while 8 per cent of oxygen would be the proper amount, 60 per cent of nitrous oxid would be insufficient to produce tranquil anesthesia. By substituting oxygen for the air we should be able to replace the 32 per cent of useless nitrogen by a corresponding quantity of useful nitrous oxid, this latter now being 92 per cent and the percentage of oxygen remaining the same. The equation would be about like this:

With air: Air.....40 per cent = { 8 per cent oxygen / 32 per cent nitrogen

Nitrous oxid.....60 per cent = 60 per cent

With oxygen: Oxygen..... 8 per cent

Nitrous oxid .....92 per cent

Dr. Hewitt, by a series of elaborate experiments, has found that from 5 to 7 per cent of oxygen is sufficient for adult males and from 7 to 9 per cent for females and children.

Over forty thousand administrations have been recorded with nitrous oxid and oxygen and not a single fatality. By heating nitrous oxid gas and oxygen the anesthetic is made even safer than when it is administered in the usual manner. Also the small percentage of those troubled with nausea from this anesthetic is still further reduced. As is well known, it is the excep-

tion to have any after-effects from gas, given either with or without oxygen, and this fraction is still further reduced by using what is called in this paper "mixed narcosis."

In 1863 (according to Hewitt, of London), morphin was first used in conjunction with chloroform during the anesthesia by Nussbaum, of Munich. He reported that patients thus treated remained in a deep sleep for a considerable time after the withdrawal of the chloroform and then awoke without nausea or vomiting. In 1869 Claude Bernard published his researches, reporting that he observed similar effects in dogs. Three years after Bernard's report morphin was given before the chloroform, with the object of facilitating the action of the chloroform and rendering smaller quantities of the anesthetic necessary. So that in 1863 to 1872 they were using chloroform with a little morphin, and now—in 1906 and 1907—we are using morphin with a little chloroform. The difference is the same as that between tweedledum and tweedledee. Morphin unquestionably is useful, whether used with chloroform or ether, but is safer when ether is used, on account of the stimulating effect of ether on the respiration.

The contraindications to morphin are respiratory difficulty, coma, great weakness, anemia and also extreme old age. If used after the operation it should never be given until all of the reflexes appear. My own practice is to give 1/16 to 1/4 of a grain of morphin, plus 1/500 to 1/150 of atropin, half to three-quarters of an hour before the operation. It probably is best to give the amount decided on in two doses instead of one. The majority of fatalities reported have occurred when chloroform was used in combination with morphin.

Hewitt relates a case in which 1/3 of a grain of morphin was given and chloroform used as the anesthetic, and on account of respiratory paralysis artificial respiration had to be kept up continuously for four hours, the patient finally recovering. Hewitt is opposed to the routine administration of this drug.

If a fatality should occur when ether is used with morphin the trouble would be that the ether had been pushed too far. Physiologically ether is indicated and chloroform is contraindicated with morphin, and the only reason for urging chloroform in this connection would be to lessen the chances of any after-effects. But if ether is given, drop by drop, either by itself or in connec-

tion with chloroform, the margin of safety would certainly be increased.

Regardless of the method used, morphin in small amounts as indicated certainly is beneficial, decreasing the amount of pulmonary anesthesia in the induction and maintenance of the general anesthesia, and thereby increasing the limits of safety, while reducing materially the nausea and vomiting afterward. I fully believe in the routine exhibition of morphin, always paying attention to the dosage and to the exceptions noted above. The routine demonstration does not mean a predetermined dose, regardless of the age, size or condition of the patient.

One must not forget the small percentage of persons susceptible to nausea and vomiting after giving morphin by itself. There is no drug in the Pharmacopeia that has not exceptions regarding its physiologic effects. Whenever this idiosyncrasy is known, chloretone should be substituted for morphin; dose, 5 to 20 grains thirty minutes before the operation, or 5 grains every fifteen minutes until the desired dose is taken. The last dose should be given thirty minutes before the operation.

Whether ether by the drop method or the gas-ether sequence, or the Allis inhaler is used, morphin will be of assistance. If we decide on the C. E. mixture it is best to have the chloroform and ether in separate bottles. Give the morphin as usual and then commence the anesthetic with a few drops of ether until the patient gets accustomed to the smell and the irritating qualities of the drug. In from one to three minutes you can put a few drops of chloroform on the mask and continue the anesthesia with ether. After the patient is thoroughly anesthetized continue the drop method of ether, unless the reflexes get a little too active; then put on from five to ten drops of chloroform and continue with ether, drop by drop.

This is a more scientific method, physiologically speaking, and also a safer method than giving the old C. E. mixture (two parts of chloroform and three of ether). A splendid dropper can be made by cutting a slight trough in the corks of both the ether and the chloroform bottles and replacing them. The bottles are then to be tested to see if they drop properly. A still better way is to place a safety pin in the neck of each bottle and put in the cork as usual, allowing one-third of the safety pin to protrude beyond

the cork. This simple device was given us by Dr. Heller of the Bronx. Still another way is simply to perforate the tin top with a pin, thus allowing the ether to come out in a fine spray. When the operation is completed cut out the metal cap entirely and replace it with a cork. Any of these devices is more satisfactory and economical than the ordinary drop bottles in the market.

Ethyl chlorid.—If ethyl chlorid is used to induce anesthesia it is perfectly safe and proper to follow it with ether, but it is very unsafe to follow ethyl chlorid with chloform; both drugs are depressants and they both kill in the same way—suddenly and without warning. Therefore, ethyl chlorid should never be followed immediately by chloroform. It is perfectly legitimate to start with ethyl chlorid, then switch to ether, and if the reflexes are only slightly in abeyance to follow with chloroform.

As I have stated in a previous paper, complete surgical analgesia from scopolamin and morphin, or any other tablet, is unscientific and will never become a routine procedure. One death was reported from morphin, hyoscin and cactin in *The Journal* of the American Medical Association, August 3, 1907. Three tablets were given as directed. The operation proceeded nicely. The patient was removed from the operating table in comparatively good condition, but died several hours later from paralysis of the respiratory centers.

Dr. Wolf, house surgeon, of the Jewish Hospital, Brooklyn, at the meeting of the Long Island Society of Anesthetists, October 2, reported a case of labor in which the hyoscin, morphin and cactin tablet was used. One-quarter of the full tablet was given in one dose, and two or three hours afterward one-half of the tablet was given. When the baby was delivered the heart was beating, but very great difficulty was experienced in maintaining respiration. Respiration ceased, not once but several times. The child finally recovered, but the method has not been used since.

It is the height of folly to go so near the border line as to reduce the respirations to four or six per minute and then to state that this is perfectly safe because the patient did not happen to die. But morphin, 1/16 to 1/4 of a grain, with 1/500 to 1/150 of atropin thirty minutes before the operation (or 1/2 or 1/3 of the decided amount in broken doses), and then using warm nitrous oxid gas and oxygen (plus a few drops of ether, when neces-

sary) as the anesthetic, is both safe and sane. In addition to this, just before the patient is taken from the table and while still under the influence of the narcotic, a high rectal enema of normal saline should be given as the routine procedure to counteract any effect that the morphin might possibly have on the kidneys and also to alleviate thirst. This should be repeated every few hours.

I would like to state a few general rules in regard to the administration of morphin, with which I believe nearly all the profession will agree.

1. Whenever morphin is to be given it should always be given before instead of after the operation, in order to obtain the benefit of this drug in the induction and maintenance of anesthesia.

2. All athletes and alcoholics should have this preliminary dose of morphin.

3. In extremes of life, the very old and the very young, morphin should be administered with very great caution.

4. Whenever morphin is administered the anesthetist should maintain a lighter narcosis than when this drug is not administered. There is no question that all or the majority of fatalities that have occurred, especially with scopolamin and morphin, were produced by ignoring this rule. In fact, the question comes to my mind now whether or not the vaunted superiority of the morphin, hyoscin and cactin tablet over the scopolamin and morphin may not be attributed to the knowledge of this fact, gained with the former tablet.

When giving ether or chloroform alone most of the reflexes must be abolished in order to maintain the proper degree of anesthesia necessary for the successful issue of the operation. When morphin is administered these reflexes can be allowed to remain, and yet the patient will be perfectly quiet. From these facts I conceived the idea of a mixed narcosis, which is simply this: To give the morphin and rely on its nerve-blocking properties, and merely put the patient to sleep with the warm nitrous oxid gas and oxygen, in the majority of cases stopping short of the stertor. If the morphin were not given, in order to maintain the same degree of anesthesia, the gas and oxygen would have to be pushed much further, and there would probably be a great deal of stertor, a free flow of saliva, and more or less cyanosis. In fact, it is impossible to maintain surgical anesthesia with gas

alone, in the great majority of cases, for any great length of time without marked cyanosis. By giving the small amount of morphin indicated we get a certain safe physiologic effect of this drug

If, then, we use the safest pulmonary anesthetic known today, namely, warmed nitrous oxid gas and oxygen, we can get and maintain the analgesic effect desired with far greater safety than if we rely on either one of these agents almost to the limit of exclusiveness. If the reflexes are not yet sufficiently abolished, add a few whiffs of ether in preference to pushing the gas and oxygen to the limit. We will thus get the beneficial effect of all of these agents, with the least degree of danger.

In several cases in which I used morphin, plus a little whisky, the anesthesia was so unsatisfactory in every instance that I was compelled to switch to chloroform or ether. In all of these cases it is barely possible that I made the mistake of giving too little oxygen, although Hewitt states that nitrous oxid is contraindicated in alcoholics and also in elderly and obese subjects. In cases of enlarged tonsils, adenoid growths or anything that would obstruct breathing, also in muscular and heavily built men and those who smoke or drink to excess, nitrous oxid would be contraindicated.

I have given this anesthetic in a great number of cases (which will be reported in detail in the near future), in the majority of them with most gratifying results. The time of anesthesia varied from ten minutes to two hours. The cases included appendectomies, laparotomies, gallstones and the usual surgical cases.

Dr. Arthur D. Bevan, in *The Journal* of the American Medical Association, July 20, 1907, relates a number of operative cases in which nitrous oxid gas was the anesthetic used. He makes no mention of the value of oxygen in relation to nitrous oxid, and none whatever of the still greater value of warm nitrous oxid gas and oxygen, but he makes a plea for a fuller recognition of this anesthetic.

Dr. Ernest Brown, of Cleveland, Ohio, by inventing an apparatus that will at the same time heat the gas and prevent the valves from freezing, has made it possible to administer gas and oxygen continuously, and with as much assurance of success as we can administer chloroform or ether. By preceding the ad-

ministration with morphin and giving this warm nitrous oxid gas and oxygen, plus small amounts of ether, when indicated, we have a nearer approach to the ideal anesthetic than anything that has been offered up to this time. The morphin, administered as suggested, not only helps in the induction and maintenance of anesthesia, but it also gives the patient that calmness of mind and assurance that is in itself one of the greatest boons that can possibly be offered to him. In addition to this, as the patient is recovering from the narcosis, the sharpness of the pain of the operation is done away with in a great measure.

On the other hand, the omission of morphin in certain cases, and the immense flow of saliva from ether, especially when the open-cone method is used, unquestionably has been responsible for some deaths on the operating table. The mixed narcosis should be useful not only in surgical cases, but there might possibly be a field for this safe, warm anesthetic in certain cases of insomnia.

According to Dr. Hewitt, the three principal objections to the administration of definite mixtures of nitrous oxid and oxygen are: 1, That they are difficult to prepare with accuracy and in sufficient quantities; 2, that different subjects require different percentages; 3, that the proportion of oxygen cannot be increased or decreased to meet special conditions arising during the administration.

The first objection is met by Dr. Brown's hot-water arrangement, which insures a continuous supply of the gas, something heretofore impossible. The second objection is met by my own simple arrangement of a third opening in addition to the two valves, and this requires but little manipulation to find the percent desired. The third objection is met by the gas and oxygen being placed very near the patient's face, thus making it possible to increase or decrease the percentage of oxygen instantly.

With these general remarks on the subject of mixed narcosis I will conclude my paper with a plea for a more careful inquiry into the subject. We have so many anesthetics, sequences and combinations that it would be ridiculous to propose that any one anesthetic should supplant all others. Cases must be selected. Knowing the weak points of our various agents enables us to make such a selection as to obtain a smooth narcosis, thus avoid-

ing disagreeable experiences and giving the patient the maximum of postoperative comfort.

[Continuous anesthesia by nitrous oxid and oxygen, especially when the gases are heated, affords a safe and absolutely painless method of performing many otherwise painful dental operations.—Ed. DIGEST.]

NERVOUSNESS; ITS SIGNIFICANCE.

BY JOHN PUNTON, M.D., KANSAS CITY, MO. READ IN THE SECTION ON NERVOUS AND MENTAL DISEASES, AMERICAN MEDICAL ASSOCIATION, AT ATLANTIC CITY, JUNE, 1907, AND PUBLISHED BY COURTESY OF THE JOURNAL OF THE ASSOCIATION.

The alarming mortality and widespread prevalence of nervous and mental disorders in recent years is sufficient to attract the attention of every intelligent citizen. At first sight it scarcely seems possible that during four years, viz., from 1900 to 1904, diseases of the nervous system were responsible for more deaths than any other class of ailments. A bulletin on health statistics has just been issued by the United States Census Bureau, which claims that no less than 302,876 persons died from some nervous disorder during this period. This large number of deaths is even greater than those who died from more common fatal tendencies of tuberculosis, typhoid fever, malaria, infectious fever, alcoholism, cancer, pneumonia, and even the epidemics of yellow fever. Hence nervous diseases take the precedence of all other classes of diseases as a death producer or destroying agent.

That nervous and mental diseases are increasingly prevalent and widespread in America is very clear to all of us; indeed, so commonly manifest in American life and conduct has the essential characteristics of so-called nervousness become that we are jeeringly dubbed by the Europeans as a race of neurotics. It is certain, however, that this European criticism needs no defense from me, for when we as medical men come to carefully consider the superstrenuous methods associated with our educational, professional, political, social and business life, we are forced to acknowledge the reasonableness of its application, besides recognizing the fitness of the soil to produce such neurotic products.

By universal consent diseases of the nervous system are roughly

divided into two great classes, viz., organic and functional. Now it is not, as a rule, exceedingly difficult to diagnosticate the diseases which have organic basis, as the present clinical syndromes which are highly characteristic of such lesions. Such, however, is not the case with the so-called functional nervous disorders, as these for the most part are subjective in character, while the lesions themselves are very obscure. It is, therefore, the functional or unclassified nervous conditions that the term nervousness usually implies, and more especially those conditions in which the clinical phenomena are largely of a subjective character, like neurasthenia, psychasthenia, hysteria, incipient melancholia, dementia præcox and similar states. Whenever, therefore, such persons consult us, after excluding all organic diseases, as well as the more typical forms of chorea, epilepsy, goiter, tics and other nervous affections attended with certain other unmistakable objective clinical phenomena, you will, in the vast majority of instances, find associated with the so-called nervousness various mental perversions or lack of mental poise, which are at least expressive of some defect of the central nervous system, which clearly indicate their psychical origin.

Hence, instead of a neurosis, we more often have to deal with a psychoneurosis. The close relation, however, which exists between nervous and mental diseases has not until recently been fully recognized, and while undoubtedly the most conspicuous feature of modern medical progress lies in the effort to bring practical psychiatry into closer touch with general medical practice, yet much still remains to be done before the close alliance which exists between nervous and mental diseases is duly recognized and given that amount of attention by the general medical practitioner it richly deserves. Moreover, modern medical science also enforces the recognition of another principle which, to my mind, exceeds in interest and importance all others yet devised relative to their prevention and treatment. It is this: that, while nervous and mental diseases are closely allied and in many instances are identical, yet in practical medicine there is an essential difference to be noted between purely nervous diseases, actual insanity and unsoundness of mind. As already observed, the clinical manifestations of nervous diseases having an organic basis are largely objective in character, hence their diagnosis is not usually attended with much

difficulty. Moreover, the more pronounced forms of insanity do not, as a rule, furnish a very obscure problem for diagnosis.

But those disorders in which the neuropsychologic clinical phenomena are blended in such a way as to obscure the underlying lesion are much more problematic, and it is the diagnosis, prognosis and treatment of these conditions that puzzle the medical practitioner. Such persons usually manifest in their clinical aspects the various kinds of nervous instability plus certain peculiar abnormal mental traits, or suffer from all degrees of unsound mental poise, which are usually considered harmless or of too trivial a character to cause any undue alarm, much less medical or legal restraint. Indeed, many such are told by their family physician that there is nothing the matter with them, that their complaints are all imaginary or that they will outgrow them; that their nervous distress is on for the occassion and that they can prevent their alleged sufferings if they wish; that is all nonsense and they ought to know better than be so foolish and irritable as well as nervous. The known progressive transitional character, however, of such obscure functional nervous conditions when neglected should place us on our guard and teach us that the unstable condition termed nervousness constitutes the very soil from which spring and develop all forms and degrees of actual insanity. Admitting that insanity always connotes unsoundness of mind, yet we must also recognize that there are very many persons who appeal to us for the relief of so-called nervousness and who perhaps are scientifically, medically speaking, of unsound mind. The failure to recognize the practical difference between the mental unsoundness which associates itself so commonly with so-called nervousness and actual insanity is, in my judgment, the cause of much confusion and error in diagnosis, prognosis and treatment of diseases of the nervous system. My experience proves that such persons usually present in their clinical aspects all forms and degrees of psychopathic abnormalities, and often by their strange, eccentric and even unreasonable conduct become the source of great anxiety and irritation to their friends and relatives as well as the family physician.

Moreover, their foolish extravagance and injurious dissipated habits may at times invite untold hardships on themselves and others, while their selfish, jealous and impulsive actions may not only render them difficult to control but also foster serious legal

complications. Notwithstanding these various morbid mental characteristics, it is also not incompatible for such persons to appear intellectually bright and precocious, quick-witted, good conversationalists and apparently able to argue logically, and because of this, their alleged rationality, be considered perfectly well by the general public and in no sense mentally or physically ill; such persons, however, to the educated, experienced physician present certain irritational neuropsychologic features which at once stamp them as being more or less mentally unbalanced, or at least unsound in mind. Hence rationality and mild insanity are not incompatible and do not militate against the diagnosis of mental unsoundness.

In analyzing the clinical results of 1,200 patients admitted to my sanitarium during the past six years, the experience thus gained would seem to justify the recognition of at least five common types or classes of persons who present themselves to the family physician for diagnosis, prognosis and treatment, suffering from so-called nervousness. They are as follows:

1. The adolescent or youthful class.
2. The phrenasthenic or emotional class.
3. The psychasthenic or exhausted class.
4. The prodigal or dissipating class.
5. The impulsive or vicious class.

In these five classes are included all those persons who manifest the various forms and degrees of so-called nervousness plus peculiar mental perversions or lack of normal mental poise, which in reality constitute the various types of mental unsoundness or incipient insanity. Such persons, therefore, appeal to you and me for advice, care and treatment as well as proper protection, and while they present differing degrees of mental unsoundness, yet because of this cannot be treated as insane or as ordinary lunatics. A slang phrase, however, can with propriety often be applied to such persons when we say that many of them "don't know where they are going, but they are on their way," viz., to the asylum, reform school, poorhouse or penitentiary. Time will allow but a brief glance at each of these classes, although their enlargement has already been considered in a former paper. In their consideration, however, it is sufficient to state that their etiology may consist of both predisposing and exciting factors, and while perhaps the majority are subject to hereditary defects and bad family training, yet there are many who,

by virtue of their constant dissipation, strenuous lives, poverty or some infection, may readily acquire the neuropsychopathic state. Hence the causes may be both congential or acquired, intrinsic or extrinsic and subject to wide variation.

1. *The Adolescent or Youthful Class.*—Under the first class we include both boys and girls who suffer primarily from the various neurotic conditions common to youthhood and the pubescent period, such as epilepsy, chorea, hysteria, menstrual disorders, neuralgia, headache, and the more serious complications of mental backwardness or feeblemindedness, like hebephrenia, catatonia, catalepsy and the incipiency of dementia præcox, together with a tendency to become incorrigible and even to commit crime. Such young persons rarely reach the asylums, nor do they in their incipient stages belong there, but they invariably appeal to their family physician for relief and advice, and what to do for them not only proves a vexatious question, but at once propounds one of the most difficult sociologic as well as medicolegal problems of the age; while its present solution by the majority of the states of the Union is, to say the least, most unsatisfactory.

II. *The Emotional or Phrenasthenic Class.*—The second class are the emotional or phrenasthenics. Such persons present every degree of emotional weakness or nervous instability, lack of will power and whose feelings are not subject to proper normal control. The chief pathologic conditions represented in this class are the so-called hysterias or phrenasthenias, the hypochondrias, and the morbid jealous and erotic states. Associated with their pathogenic, psychologic manifestations are all kinds of stigma or disturbances of the various functions of the nervous system, hence their clinical syndrome is extremely variable, while the symptoms are protean in character. Such persons take to sickness as readily as ducks take to water; indeed, illness with many becomes a profession. As a class, while apparently rational, they are exceedingly unreliable in their deportment as well as insincere in their actions, while their statements often lack the dignity of truth and justice. This class is chiefly represented by young females, yet many men are found roaming at large in its undefined pathologic territory. Like the preceding class, they appeal to the family physician for relief, but he, in his dilemma, rarely resorts to anything beyond the application of temporary expedients.

III. *The Exhausted or Psychasthenic Class.*—This class includes a large clinical area of persons suffering from neurasthenia, or nervous prostration, psychasthenia, psychosomasthenia, hypochondria, incipient forms of melancholia, paranoia, delirium, confusion and stupor, which accompany or follow the toxic psychoses, typhoid fever, scarlet fever, pneumonia, malaria, la grippe and other acute infections and poisons, beside those who suffer from the various kinds of sexual perversions. The chief clinical characteristics, however, of this class are seen in all degrees of exhaustion and strain, of the various functions of the nervous system, which leads to morbid self-introspection, selfishness, suspicion, doubt, anxiety and all degrees of morbid fear.

Often their occupation consists in talking about themselves and their ailments, which cause them to become diet cranks, health cranks, religious cranks, besides leading them to readily entertain false ideas about diseases, drugs and doctors, which they juggle with until they finally become easy prey for quacks and quackery, besides willing victims to the knife of the unscrupulous surgeon. Their rational conversation, however, readily acquits them from all forms of medical or legal restraint, hence they are allowed to procrastinate until the curable borderland is passed and their psychoneurosis becomes sufficiently pronounced and incurable. Then the family physician is finally called on to sign a certificate committing them to the inane assylum, and thus become a ward of the state the rest of their lives.

IV. *The Prodigal or Dissipating Class.*—Such persons by virtue of their mental unsoundness, whether congenital or acquired, more often stray from the paths of physical, mental and moral rectitude, thus becoming willing victims to all forms of temptation and licentiousness. It therefore includes those who indulge in extreme excesses of all kinds, like the reckless sporting libertine, the drug habitues and the inebriates, many of whom suffer from syphilis and other sexual disorders. In this class are, therefore, to be found those who suffer from delirium tremens and other forms of alcoholism; the incipient forms of general paresis, cerebral and other forms of nervous syphilis, beside the various drug addictions.

Socially speaking, they are usually popular business men of talent, first-class mechanics and high-strung women of more than average ability and beauty. Their chief delight is found in fast company,

wine, music and all kinds of sports, which indulgence they carry to an extreme degree. Hence they take life easy, spend money freely and are high livers, frequenting the hotels, clubs, theaters, saloons and similar places to excess, besides enjoying prize fights, horse racing and betting. It includes, therefore, a large and growing class of neuropsychopaths, whose proper medical and legal control at the present is exceedingly lax and most unsatisfactory.

V. *The Impulsive or the Vicious Class.*—This class includes those persons whose mental unsoundness or psychopathic tendencies lead them into all forms of impulsive and even vicious conduct. Hence clinically they present all kinds of morbid propensities like that to steal, lie, cheat, set on fire and even commit suicide and homicide. Such persons, therefore, are known technically as kleptomaniacs, pyromaniacs, nymphomaniacs, etc., and as a class represent the more serious degrees of mental unsoundness and perhaps are nearer actual insanity than those belonging to the other classes. Another class might still be added:

VI. *Senile or Decadent Class.*—This includes both men and women who have passed the active period of life and suffer from the various abnormal psychologic complications incident to second childhood. Owing to their mental weakness, such persons are very restless, irritable, impulsive and quite emotional. They also at times become noisy, vicious, and get beyond family control; what to do for them, however, taxes the skill, judgment and knowledge of the ablest clinicians.

Differential Diagnosis.—In thus alluding, perhaps imperfectly, to the chief clinical characteristics as they appear to me of those persons who consult us concerning the various manifestations of so-called nervousness, or, more properly, those who suffer from mental unsoundness, my remarks may appear at first sight to be of such a general and far-reaching character that some of you, or at least those whose experience is limited, may be tempted to offer the criticism that the clinical pictures thus presented could at least in some of their aspects be made to apply to the great majority of mankind, and which in a measure may be true. But it is the degree of damage existing or made on the higher controlling centers of the brain or the combination of symptoms and circumstances, together with all the facts belonging to the family and the personal life history of the patient, on which the diagnosis of mental un-

soundness is based, rather than on any one particular mental peculiarity or even set of circumstances. From this standpoint, if time and your patience allowed, it would be easy for me to multiply reports of cases taken from the clinical records of the 1,200 cases admitted to my private sanitarium during the past five years, which would justly fit each class described, and in which, when made familiar with all the facts and circumstances surrounding them, you would not only agree, but readily discover that while they presented many features in common with the average normal individual, even to the extent of rational conversation and marked reasoning ability, yet there would be sufficient evidence forthcoming to convince even the most skeptical that the clinical syndromes presented not only furnished ample evidence of mental unsoundness, but that also each case came strictly within the province of borderland insanity.

ORTHOCRESOL-FORMALIN IN THE TREATMENT OF GANGRENE OF THE PULP.—The author recommends the application of orthocresol in the treatment of gangrene of the pulp in preference to tricresol, as advocated by Buckley, whose mixture of orthocresol, metacresol and paracresol contains 90 per cent of orthocresol, which is evidently the most powerful agent in the mixture.

Dr. Mayrhomer therefore mixes pure orthocresol with formalin in the proportion of 4:2, but obtains equally good practical results from a mixture of 4:3.

For filling the root-canals after treating, for gangrene and for covering amputated pulp stumps, he applies a paste of the following composition:

Orthocresol .....60 grains
Formalin (40 per cent).....30 minims
Zinc oxid, q.s. (125-150 gr.) to make a soft paste.

This paste is prepared in bottles with wide necks, not in tubes, and after partial evaporation can be softened again by adding a few drops of orthocresol-formalin. Within the two years of his experience with orthocresol-formalin, the author has obtained very favorable, practical and therapeutic results, which led him to believe that the application of orthocresol-formalin rests on better theoretical foundations than that of tricresol, since isomeric aromatic substances, in spite of being composed of the same atomic groups, may have very different pharmacodynamic effects. For the theoretical solution of the problem of a rational treatment of gangrene it seems very desirable to operate with only one substance.—*British Dental Journal.*

Digests.

FACTORS AFFECTING THE APPEARANCE OF THE ANTERIOR TEETH ON ARTIFICIAL DENTURES. By Charles R. Turner, D.D.S., M.D., Philadelphia, Pa. The cosmetic requirements of artificial dentures are that they shall restore the fixed expression of the face, shall permit the normal activities of the facial muscles of expression, and finally, that when exposed to view in the usual movements of the lips they shall be in harmonious relationship with the other features of the face. Inasmuch as it is the anterior teeth which are almost exclusively concerned with the appearance of the dentures, and as it is the distal teeth, bicuspids and molars, which are related to their chief function—that of mastication—and since the former may be arranged to answer the requirements of appearance with little or no detriment to the satisfactory arrangement of the latter for masticatory purposes, the details of appearance of the anterior teeth are those which most concern us in satisfying this phase of the cosmetic purposes of artificial dentures.

To reduce this question to its simplest terms, and divorcing it temporarily from its utilitarian aspect, which is of equal if indeed of not greater importance, the problem to which the prosthetist must address himself is that of placing in an edentulous mouth substitutes for the missing teeth which shall convey to the beholder the conviction of original ownership. This purpose is as old as dental prosthesis itself, and the results in its achievement have gradually improved as time has gone on. Since the advent of porcelain teeth as substitutes for the natural ones, these increasingly good results have been due to the improvement in the color and translucency of the material used, and to better imitation of the forms of the teeth by the manufacturers. In the days before the manufacture of teeth upon an extended scale, when each dentist carved and baked his own representations of the lost organs, a few men were competent in the production of satisfactory substitutes; yet these were exceptional cases. These men were skilled in the working of the crude material and in fashioning it into nature's form according to their standards, but it is not believed that their results were comparable with those of the present period of molded teeth and ac-

curacy in porcelain mixing. Now the manufacturer's products make the specimens of the earlier period look poor indeed.

And yet I believe you will agree with me that today our restorations, taken as a whole, are by no means what we desire them to be, and that comparatively few full upper and lower dentures are inserted which do not exhibit evidences of their artificiality interpretable by the ordinary beholder, and certainly capable of detection by the skilled observer. The power of observation in the average layman has improved quite in proportion to the skill of the prosthetist. It is the old problem of marine warfare over again; armor plate which shall resist the most powerful projectile extant is no sooner made than a gun capable of piercing that armor is designed or a more powerful explosive discovered, and the problem for the armor-plate constructor is again enlarged. The standard of prosthetic restorations constantly advances—how are its achievements to progress?

In a paper read before the Chicago Odontographic Society in February, 1906, the claim was made that the cosmetic phase of dental prosthesis could better be undertaken from a scientific viewpoint than from the point of view of art. It is purposed to adhere to this fundamental principle in the present discussion, and to point out the detail of its application as this relates to the appearance of the anterior teeth on artificial dentures. The relation of art to this question will also be considered.

In nearly all instances the construction of full artificial dentures must be undertaken without data obtained from the original teeth themselves. In the rare cases in which the natural teeth have furnished the necessary information the problem is not difficult, and consists in simply copying the originals and in constructing the set with these as guides. When no such data are obtainable, the task of the prosthetist is somewhat similar to, although vastly simpler than, that successfully accomplished by several famous paleontologists, who with a single fossil bone of an extinct bird or reptile have restored the skeleton of the animal, subsequent discovery of fossilized remains confirming the restoration. This requires scientific knowledge and scientific reasoning. It is by the use of these that the prosthetist will be able to obtain the best results in his work.

In undertaking the problem to which he must address himself,

the prosthetist does not have to construct the teeth which he utilizes, and thus does not have to work with absolutely raw material, but is able to select from the stock of the dealer teeth which in the majority of instances may be rendered suitable for the case in hand. It must be said concerning the stock of the manufacturer that it contains many artificial teeth which are defective in form and translucency. Many teeth are found of the shape of one temperament and the color of another, and while there is usually an abundant range in size and colors, and while teeth with good outlines are usually obtainable, they are often defective in labial contour, since a large majority of these teeth have comparatively flat faces, this being especially true of the cuspids. When they are set up this results in a flattened labial surface of the arch, which lacks the character which prominence of the individual teeth would confer upon it. The common forms of teeth in use for vulcanite work have another serious disadvantage, especially in the case of those with short bites, in the effect upon their translucency of the dark vulcanite with which they are backed up; and teeth originally designed for celluloid work—called "natural form teeth"—and the countersunk pin teeth, whose translucency is not thus interfered with, are to be preferred in all cases in which they may be used.

In the selection of teeth for a given case the chief requirements are those imposed by the temperament and age of the patient. There are certain mechanical demands incident to the size, form, and relation of the jaws and the base upon which the teeth are to be mounted, but the cosmetic requisite is that they shall exhibit a certain size, form and color which is in accord with the other physical characteristics of the person for whom they are to be used. The use of the generally accepted classification of mankind into various temperamental classes as the basis for the determination of these physical characters of the teeth is entirely scientific in purpose, but this classification does not rest on a completely scientific foundation. However, it is the best we have at present and it is fully abreast with out knowledge of the subject, and we feel justified in saying that when teeth are used for an edentulous case which corresponds to the indications for that case according to the tables of Thompson, Ivy and others, we at least shall not be able to detect discrepancies on that score.

As influencing the selection of the teeth, the age of the patient

must be considered in its relation to their color, but the age of the patient is related to other matters presently to be considered, and they can best be discussed conjointly.

Let us assume for a moment, then, that the colors of the teeth have been determined satisfactorily. This is only the first and fundamental step in the process of restoration, for as yet we have only the raw material, and so far have only displayed the judgment necessary in properly selecting it. This material is to be adapted to the case for which it is to be used. Let us contemplate for a moment its condition as obtained from the dealer.

The teeth have the form of the crowns of the natural teeth in youth, before they have been influenced by any of the factors of their environment. They present unworn cutting edges, and exhibit none of the evidences of use which are observed upon natural teeth; they display no marks of age, none of the defects incident to pathologic conditions. If we put them in place in this condition for persons at the plate-wearing age, they appear at once an anachronism. We should learn something from the manufacturers of antiques, who have become skilled in the artificial aging of metal, pottery and wood, so that it is now possible to purchase in many of the markets of the world a vase from the tomb of Agamemnon or a scarab of the time of Thothmes III.

This raw material must be altered from its original state to one of suitability for the case in hand. And having been properly altered and adapted to the case for which they are designed, the teeth are to be arranged—set up in a manner that is completely adapted to the case. They are to be placed in such relative positions to each other, to the lips, to the opposing set, that by occupying positions which natural teeth have been found to occupy, they appear as the natural teeth themselves.

But what is the underlying idea in these various details in the selection, alteration and arrangement of the teeth by which they are made to present a natural appearance? They are selected with a view to their suitability for a person of certain physical attributes, but the teeth as obtainable are new, and without the impress of individual experience or environment. Starting with them in this condition, they can be made to appear natural only when they exhibit the effects of the causes which have been operative during the period of years of their supposed existence in the mouth of the

individual. We reason that they have been and are the property of the individual, when they display evidences of forces acting in this environment. The more nearly they exhibit the effect of a cause evident, discoverable, or justly inferred in the mouth of the person in question, the more natural they seem to us. It is the great principle of relationship of cause and effect by which this conviction of naturalness is enforced. And this, I maintain, establishes the scientific viewpoint in undertaking this problem.

To more fully comprehend the application of this principle, let us look at the detail of the alteration and arrangement of the teeth to promote this idea.

The factors which tend to make alterations in the appearance of the natural teeth after their eruption and the establishment of the denture are largely dependent upon the age of the individual. The age influences the color of the teeth, for while in a given denture they are all of nearly uniform color when first erupted, in adult life there are normal differences in color, which are easily distinguishable and which have been ably described by Royce. Then, as the years increase, a continuation of this molecular change results in a further deepening of their color, and this is measurably proportioned to the age of the individual. These facts have bearing upon the selection of the teeth, for it is simpler to select satisfactory teeth in this way than to color them by subsequent staining. The practical effect of these principles upon tooth-selection is to make the choice of teeth of a general color in accord with the temperamental indication, to select them of a shade of this color in accord with the age, and to vary the shades of the individual teeth according to the plan of Royce.

Another result of age or incidental thereto is the wearing of the teeth from use. While in prehistoric times the teeth of mankind frequently wore out by reason of the coarseness of the food, the conditions of modern civilization are such that this is seldom observed now. Nevertheless it is unusual to find a set of natural teeth in a person of thirty-five years or more that do not exhibit very palpable evidences of use, and in certain temperamental classes, notably the lymphatic and its combinations, the wearing is very marked. In a given case this is largely proportional to the age; in each case its degree is dependent also upon the predisposition

to wear of the temperamental class. Anatomists recognize four degrees of wear, but it is chiefly the first and second which may be observed in natural teeth at the present time. These are where the enamel is slightly worn, constituting the first, and where the denture is exposed and the cusps are worn off, constituting the second degree. In a few instances the third degree is found, in which the teeth have been reduced in height. The degree of wear is incident to the temperamental class in which it is placed, because in teeth with long cusps it is chiefly the up-and-down movements of mastication which are possible, and there cannot be as much abrasion as is possible with short cusps, in which case lateral movements of the mandible are possible and a common habit. In these latter cases, therefore, there is greater wearing down of the occlusal surfaces. The wear-resisting quality of the teeth is also related to the question, and in the lymphatic temperament and some of its combinations the teeth are not of the best structural quality.

Is it enough, then, that the artificial teeth shall exhibit worn edges in accord with their structure, temperament and age? No. There are other factors determining the detail of the wear which must be taken into account to give the dentures the individuality necessary. The wearing of any tooth-surface is caused by the bearing of another tooth-surface against it in the mastication of the food. Other things being equal, the two surfaces will exhibit a similar amout of wear. In a typical normal denture the wear proceeds equally upon all the occlusal surfaces. The detail of wearing must have a relationship to the method of movement of the mandible. It is also related to the occlusion of the teeth, and in the anterior teeth, to the character and amount of the overbite. For example, the manner of movement of the mandible being due to the masticatory habit, which in a normal case consists in alternating the crushing activity upon the two sides, it is in the alternate lateral excursion combined with a little protrusion that the chief amount of this wearing is done. Of course, some is accomplished during the movements of incision, but the chief determining movements are those of mastication. If we examine a case with the mandible in this lateral and protruded position we shall see what points are in contact, and these are the ones ground down in the movement. With the mandible moved to the other side the exam-

ination is repeated, and by averaging up these effects a logical example of wear is established. If the cusps of the temperament are short, and if the second degree of wear is indicated, the denture presents a characteristic appearance in which the cusps are worn down, the occlusal line of the anterior teeth becomes almost a straight line, and the dentin is exposed and in many instances badly stained.

Again, the amount of overbite determines the character of the wear of the anterior teeth. If this be very great, the wear may be almost imperceptible, as these teeth do not come in contact in the masticatory movements of the mandible; or the wear may occur only during incision; or if there be a very much curved "curve of Spee," the wearing occurs at the expense of the lingual enamel plate of the upper teeth and the labial of the lower, resulting ultimately in leaving thin enamel walls, which are easily fractured and present a ragged, broken edge. If the overbite be of small amount in the first degree of wear, the denture presents grooves on the edges of the teeth which correspond to the positions of their opponents, the cuspid exhibiting frequently a notched end. If the cusps and overbite are short and the teeth inclined to wear, we have in the second degree of wear the establishment of the frequently seen "edge-to-edge" bite. Nor must we neglect the interproximal wear that is found in certain classes of teeth which are close-set, regular, with broad and flat approximal surfaces. These appearances must be produced in the artificial teeth by grinding, suiting them to the various factors which may be diagnosed as possible considerations in a given case.

Age also influences the tissues about the tooth. There is a normal recession of the gum, the rounded free margin giving way to a thin sharp edge terminating abruptly at the cervix. There is also a pathologic recession, resulting in exposing the cementum and presenting a rounded thick gum margin. These may be imitated to advantage with the material with which the gum restoration is made, but of course only in association with the teeth, temperament, and age for which they are suited.

As an indirect result of age, or perhaps rather as its frequent accompaniment, we find evidences of certain pathologic states in the teeth themselves. These exist first as errors in development

which are expressed as defects of the surfacs of the teeth, affecting their appearance. The white spots sometimes found on the labial surfaces of incisors and cuspids belong to this class, and also those other defects in enamel formation which result in peculiarly shaped teeth. It is rarely advisable to imitate these defects in the artificial teeth for full dentures, unless a clear history of their existence in the natural teeth be obtainable; then, for purposes of continuing the identity of the denture, they are justifiable. They are chiefly useful in the matching of artificial teeth to remaining natural ones in cases of partial restoration.

The most common pathologic phenomenon of the natural teeth is that of caries. How few natural sets of teeth reach maturity, much less the plate-wearing age, without some of the evidences of this disorder being visible. This does not mean that large cavities are necessarily seen on the labial surfaces of the anterior teeth, but certainly a majority have approximal cavities and many of these are filled with gold. Surely it will be natural for the artificial teeth to exhibit evidences of the process by which in many cases their predecessors were lost. There seems to be a prejudice against the insertion of gold fillings in artificial teeth. This is probably due to two things—the fact that in the natural teeth a display of gold is to be avoided as much as possible, and also that so many artificial dentures are seen in which this has been done without a satisfying regard for the location of the supposed carious cavities. While it is probably better taste to insert them only in substitutes for teeth with which a plainly visible gold filling was associated, and to secure naturalness by other means, still they may be used with perfect propriety in other cases, if not used in excessive quantity and if placed in a position in the tooth and in a manner consistent with their occurrence naturally. An approximal filling in both laterals, as these are usually the first teeth to require such attention, or rarely in the centrals, and sometimes at the cervical margin of the central or cuspid, is perfectly consistent with good practice. It must not be forgotten that—viewed from a temperamental standpoint—the types of teeth most susceptible to caries are the ones which are to be selected to receive the fillings. It would be manifestly wrong to insert them in the strong sanguine and sanguolymphatic and sanguobilious temperaments, but more suitably in the combinations

of the nervous temperaments, where the delicate teeth and their disposition to irregularities greatly favor the formation of carious cavities.

Imitation of the death of the pulp and the subsequent tooth discoloration, by the use of a dark artificial tooth or the use of a gold crown in the bicuspid region for sake of naturalness, are devices usually barred on esthetic grounds.

Erosion and the yellow stain at the necks of teeth are frequently imitated to advantage, the former by grinding and staining, the latter by staining alone, using for this purpose the oil stains obtainable from the manufacturers. It is often very advantageous to stain the occlusal ends of the anterior teeth for a patient who chews tobacco; by using a combination of brown and green stain we may imitate the stains found in the mouths of smokers.

Another pathologic condition resulting in the loss of the teeth is pyorrhea alveolaris. Before the teeth are lost they often change their relative positions owing to changes in the pericementum, and these may often be imitated in the arrangement of artificial teeth for such cases. The commonly observed density of teeth which are the seat of pyorrhea must not be lost sight of in this connection, and when teeth with smooth surfaces and yellowish cast are used for a case, any effort to imitate recession of the gum, irregularity of arrangement and freedom from caries will be perfectly consistent with good judgment.

Now that the details of the individual appearance have been discussed, an intimate knowledge of the ideal or typical arrangement of the teeth is necessary as a basis for the arrangement of the teeth so that they may have a natural appearance when viewed collectively. Not that this is a plan to be followed in the setting up, because there exist comparatively few dentures which are perfect in this particular, but as an ideal of the plan which nature has in view for each natural denture. In the same way as physiology or normal cell activity must be mastered before pathology can be understood, the typical or ideal arrangement of the teeth must serve for the better understanding of the observed departure from it. Perhaps this knowledge may also be useful as giving an opportunity for expressions of the humor of some of our fellow prosthetists, who have endowed ancient and unbeautiful females with

dentures which by their regularity indicate the acme of perfection and purity of character, thus perpetrating a cruel joke on the harsh and nature-loving world about them.

Presuming familiarity with the ideal arrangement of the teeth, let us proceed to inspect the influences which affect the positions of the individual teeth. Such influences are the form and relation of the alveolar ridges, the occlusion of the teeth and the temperamental characteristics as expressed in the form of the teeth. In addition to this, the relationship of the teeth to the lips greatly affects their appearance, but it is not to be considered in this connection and will be referred to later.

In certain temperamental classes, especially the bilious, lymphatic and sanguine, and most of their combinations, the teeth are inclined to be arranged regularly in the arch, but they seldom conform to a perfect arrangement. In the nervous temperament and its various combinations, especially with the bilious, many irregularities are observed, and some of these can be advantageously imitated in artificial dentures. This must of course be done only in suitable cases, and the irregularities in alignment and occlusion must be the same as are observed in nature. To attempt to describe more than a few of these which are of common occurrence would be to undertake a catalogue of orthodontic cases, and it is only necessary to imitate certain kinds of these irregularities, for reasons connected with the functioning of the dentures and their maintenance. It is necessary, however, that the irregularity imitated should be one observed in natural teeth under similar circumstances. Whenever possible, the relationship of cause and effect must be discoverable or easily inferred, and the irregular arrangement must not be determined regardless of its possible connection with the case. The causal relation is often indicated in the teeth themselves in the fact of their sharp cusps and wide cutting edges—qualities which tend to easily establish crowding in the arch and malocclusion. The relation of the jaws is closely associated with the occlusion of the teeth; protrusion of either upper or lower jaw is associated with a very characteristic arrangement of the natural teeth, and this must be imitated as far as other denture considerations will permit. The irregularities are those of the relative positions of the teeth, their occlusion, and the inclination of their axes. A few

cases which frequently occur may be mentioned: (1) Rotation of the centrals, their distal surfaces placed lingually. (2) Rotation of the centrals, their distal surfaces placed labially. (3) One central overlapping the other, with laterals overlapping. (4) Lapping laterals. (5) Elongated centrals. (6) Inclination of long axes of teeth. (7) Centrals inclined lingually, laterals lapping. (8) Spaces between the central incisors. (9) Single prominent central incisor. (10) Rotation of the laterals.

The following are possible irregularities with the lower teeth: (1) Centrals with the distal surfaces turned outward. (2) Rotation of one or both lateral incisors. (3) Overlapping of laterals or centrals. (4) Overlapping of one or both cuspids.

The irregularities in one jaw must fit in with those of the other. The relative positions of the teeth having been determined upon, the upper ones are to be set up with the space between the central incisors in correspondence with the median line of the face. The curve of the arch is to be obtained from the jaw itself, allowance being made in setting the cuspids for the greater amount of absorption occurring in this region. The inclination of the long axes of the teeth is determined by data obtained from the bite plate: they are to support the lips as far as possible in their original positions and also have that inclination to the ridge which is consistent with their natural appearance and with the maintenance of the dentures. In determining these matters all the information possible should be obtained from the lips and alveolar process of the patient, observation of which often gives some indication of the proper positions of the teeth.

Finally, knowing that in a majority of natural dentures the cutting edges of the upper anterior teeth extend about 1-32 of an inch below the upper lip in repose, the line of the cutting edges is established in this position from information furnished by the bite plate. All these factors may be utilized in adapting the artificial dentures to the individual case, and natural appearance has been obtained by success in these efforts.

But is it enough to be able to construct a natural-looking denture? No. Here is the consideration of art, using that term so as to signify the science of esthetics. Many natural dentures may be found which are far from beautiful and yet are natural enough.

To copy them would not be advisable if there is an opportunity of choice in the means for obtaining the given end. Art is valuable, then, as an aid to a knowledge of the conditions found in nature, because it enables one to select the most beautiful, but in prosthesis it must always be subordinated to the considerations under discussion, and can act only as a useful adjuvant. As applied to determining the appearance of the upper anterior teeth, it supplies the judgment in that subtle synthesis of lines in which the whole is composed. It recommends symmetry in some cases, balance in others and harmony in all. I believe that the advances of the future, as well as the successes of the present, are best obtainable with this habit of thought.—*Dental Cosmos.*

DIAGNOSIS AND TREATMENT OF ALVEOLAR ABSCESS. By Arthur D. Black, B.S., M.D., D.D.S., Chicago, Ill. In connection with the preparation of this paper I have reviewed hurriedly more than two hundred journal articles scattered through the literature from the time of the publication of our first dental journal in 1839 to the present. This review has not been sufficiently exhaustive to enable me to present in detail the history of the progress of the profession in the treatment of such cases, nor give proper credit to many men who initiated the various advances. My object in making the review was to present as a part of this paper a brief report of the progress of the profession as a whole, with the mention of a few men who have contributed to that progress. I would like, if possible, to impress the slowness with which the members of the dental profession, as a whole, have progressed in the diagnosis and treatment of alveolar abscess, and present some particular points about which there does not yet seem to be a very clear understanding, judging from the many cases presenting in our oral surgery clinics, which have previously been under the care of dental practitioners.

Before referring to the journal articles I wish to mention that Fouchard, 1733, speaks of alveolar abscess as being connected with a tooth, and that it disappears with the extraction of the tooth, but he makes no mention of the pulp of the tooth, evidently not having discovered the actual cause of the condition.

In the *American Journal of Dental Science,* 1839-50, I find alveolar abscess mentioned only about half a dozen times, and

then only to report cases in which the pus took some unusual course. In every case the treatment mentioned was the extraction of the teeth involved, there evidently being no thought of the possibility of saving them. In fact, until in the sixties it was the very common practice to also extract teeth with living pulps that had been exposed by caries.

In the *Dental News Letter, Vol. IV, 1852-3,* page 34, is an article on "The Treatment of Exposed Dental Nerves by Hullihen's Operation," by Dr. C. O. Cone, which calls attention to the operation originated by Dr. S. P. Hullihen, of Wheeling, W. Va., which consisted of "making a hole through the gum. the outer edge of the alveolar process and the root of the tooth, into the nerve cavity, and then in opening the blood vessels of the nerve." This operation was known as "Risodontryphy" and it was claimed that, in cases in which the pulp was exposed by caries, a filling could be placed immediately and the pulp would remain alive. This was probably the origin of the treatment of subsequent years, and to a considerable extent yet, of drilling "vent holes" into teeth with dead pulps and leaving them so.

In the *American Journal of Dental Science,* second series, Vol. V, 1855, page 458, Dr. C. W. Ballard, in an excellent article on the "Treatment of Alveolar Abscess," says: "My usual method of operating at present is as follows: After carefully removing all decay (if any exists) from the external cavity, I cut directly into the nerve cavity, making as large an opening as is necessary for convenience, then, with suitable instruments, remove the decomposed matter from the canal, together with the discolored bone, which, in many instances, is found at the most depending portion of the pulp cavity. This done, the canal must be washed throughout its whole extent with pure water, using for this purpose a small but powerful syringe, having the tube so bent as to allow of its introduction in the nerve cavity. The cavity should then be dried by filling to the apex of fang, or fangs, with floss silk, taking as fine a strand for each fang as can be successfully managed with the instrument, and leaving, for convenience of removal, a portion of each strand protroding from the cavity to the length of an inch or more. This done, I slightly moisten some strands of the silk with creosote, and

then removing the first strands, I immediately refill with the latter, and then close the external opening with wax.

"I usually examine these cases every twenty-four or forty-eight hours, renewing the floss silk with creosote, if it seems necessary, and without it when the first application seems to have been effectual. If, after discontinuing the creosote for twenty-four or forty-eight hours, no trace of the odor of decomposition can be detected, I fill the fangs at once to the apex with gold, leaving the crown to be filled at a subsequent period. I make this delay in completing the operation with the view of avoiding the danger of periosteal inflammation, which might be the result of too much pressure at so critical a juncture."

In the *News Letter,* Vol. X, 1856-7, page 4, Dr. J. S. Clark, of New Orleans, is quoted as saying that he had "practiced fang filling with gold for the past eight or nine years." In the same volume, page 234, Drs. Spaulding, Taft, Watt and others report success with gold as a root filling.

In the *News Letter,* Vol. XII, 1858-9, page 274, Dr. T. L. Buckingham, of Philadelphia, "expressed his belief that when an abscess has existed for a length of time, and the fang is denuded of its periosteum, that all that can be done is the removal of the tooth." He evidently investigated the condition of the tissues surrounding the end of the root, although he does not tell us how he did it.

In the *Cosmos,* Vol. I, 1859-60, page 31, Dr. Collins suggests "when suppuration is established, the propriety of passing a lancet through the gum down to the bone, and then drilling the alveolus opposite the apex of the fang, so as to facilitate the escape of pus."

In the *Cosmos,* Vol. III, 1861-2, page 556, there is reported a case in which Dr. Hudson, of Philadelphia, had filled the root canals of the upper centrals with gold, about 1830, and they were in perfect condition at the time of the report. Dr. Hudson was one of those men who were far in advance of the profession. We must remember, in reading of the work of individuals in the early days, that the opportunities and means of disseminating knowledge were very meager, and a new idea or method could not be

spread, and most men would not spread anything new if they had the opportunity.

In the *Cosmos,* Vol. V, 1863-4, page 11, Dr. C. P. Fitch condemns the "practice of destroying the nerve and subsequently filling the cavity of decay, leaving it to disintegrate." This statement refers to the common practice at that time of applying arsenic and then placing a filling without removing the pulp.

In the *Cosmos,* Vol. V. 1863-4, page 54, Dr. C. P. Fitch has an article on the treatment of alveolar abscess, in which he says, "To abort an impending abscess, the contents of the root canal should be removed, and a dressing of cotton and creosote placed, also cold applications, on the gum." He further states, "If pus has formed and there is slight fluctuation, incise at once and open to the apex through the alveolus." That does not sound so bad after forty-four years.

In the *Cosmos,* Vol. V, 1863-4, page 565, Dr. Clowes says, "A tooth with a dead pulp always has a discharge, and, with this conviction, had not attempted to remove pulps but the teeth, when he could not save the pulp alive."

In *Cosmos,* Vol. VI, 1864-5, page 1, Dr. J. D. White mentions the treatment of dead pulp by removal and placing of cotton steeped in creosote in the canals.

In *Cosmos,* Vol. VI, 1864-5, page 538, Dr. C. P. Fitch gives the first mention I found of the points in the diagnosis of a dead pulp, and states that he thinks such teeth can be saved by pulp removal and creosote on cotton treatment.

The articles mentioned, together with those of the succeeding ten years, indicate that the treatment of pulps was not seriously undertaken by the profession previous to 1865, and that after 1870 the attempts to save teeth with exposed living pulps, or with dead pulps, became quite common practice, the method generally employed being the removal of the contents of the canal and placing of from one to many treatments of creosote on cotton, most operators leaving in such a treatment as a root filling. Quite a number of the better operators used gold foil for root filling, as mentioned in the references above. The first mention I found of a guttapercha root filling was in the *Cosmos,* Vol. XIV, 1872, page 371, in an article by Dr. Oscar Doyle, of Louisville, Ky.

A paper by Dr. Homer Judd, of St. Louis, who was the leading

man of the West in his time, in the *Missouri Dental Journal,* Vol. I, 1869, page 321, and a series of articles in Vol. II, of the same journal, pages 92, 136, 175, 210, 260, 292, 331, 365 and 425, are by far the most explicit and carefully written of any articles in the early days; in fact, few have appeared since that equal them. Dr. Judd's clear and concise statements of the histology, pathology, points in diagnosis and treatment bear the mark of the great teacher that he was. In these articles he refers to the occasional necessity for exercising the end of the root if it has been denuded, showing that he was trying every possible method of saving teeth in the most desperate cases at a time when the profession, as a whole, had hardly begun to even think of attempting to save abscessed teeth in the most favorable cases.

Another series of articles which did much to diffuse knowledge of this subject were those of Dr. J. N. Farrar, of New York, appearing in the *Cosmos,* Vol. XVIII, 1876, page 582; Vol. XX, 1878, pages 366, 414, 489 and 531; the *Missouri Dental Journal,* Vol. XI, 1879, pages 18y, 241, 301, 363, 423, 483 and 545. These articles were well illustrated, showing the destruction of tissue about root ends, and other pathologic conditions. Dr. Farrar lanced acute abscesses early, and in cases of "blind abscesses" made an opening through the bone to the root end for drainage.

In most of the articles published previous to 1870, that were reviewed, almost no mention was made of the different conditions that might be present in the tissues about the end of the root in cases of chronic abscess. It appears that each operator followed some more or less set method of treating teeth that were abscessed, and, in cases in which a "cure" did not result, the teeth were extracted. There seems to have been almost no attempt to ascertain why some healed and others did not. Too many of our practitioners of today are following the same plan; they are administering treatment without getting at the actual cause of the existing condition.

Of the more recent articles we should mention those of Emil Schreier, of Vienna, on the use of potassium and sodium to neutralize and saponify the disintegrated tissue in the pulp chambers and canals, the *Cosmos,* Vol. XXXV. 1893, pages 22 and 863; a paper by Dr. C. N. Johnson, of Chicago, in the *Cosmos,* Vol. XXXIV, 1894, page 959, which gives an excellent outline of the

treatment of these cases via the pulp canals; a paper by Dr. J. S. Cassidy, of Covington, Ky., in the *Cosmos,* Vol. XXXVI, 1894, page 1018, on the use of formalin in pulp treatment; a paper by Dr. G. V. Black, of Chicago, in the DENTAL DIGEST, Vol. XI, 1905, page 1240, entitled "A Consideration of the Conditions Pointing to Grave Results in, and the Causes of Death from, Alveolar Abscess;" an illustrated article in the *Cosmos,* Vol. XLVIII, 1906, page 16, by M. I. Shamberg, of Philadelphia, in which the importance of the X-Ray in diagnosis is beautifully shown; a short paper by Dr. M. H. Cryer, of Philadelphia, in *Cosmos,* Vol. XLIX, 1907, page 919, in which the more remote effects of alveolar abscess are considered; and several articles by Dr. J. P. Buckley, of Chicago, the most recent of which appears in the *Dental Review* for 1907, Vol. XXI, page 1097, in which the use of formalin and cresol are recommended to neutralize the contents of canals before removal.

I do not mean to present these as anything like a complete list of good writings on this subject. They are simply a few which I have run across which are good, and serve to give us a fair idea of the progress made in the treatment of the conditions under consideration.

It is only within very recent years that the dental profession has begun to differentiate between the varying conditions presenting and treat them in a rational manner. There still remain certain points in the diagnosis and treatment in which the profession as a whole seems not to be doing as well as it should, and it is the purpose of this paper to emphasize these points. There are at the present time too many teeth extracted in the treatment of abscesses; there are too many cases of chronic abscess as a result of imperfect pulp canal treatments and fillings; there are too many chronic abscesses allowed to continue without full investigation as to their cause, followed by proper treatment; there are too many cases of caries of bone, necrosis and other serious complications resulting from lack of prompt action in the treatment of acute abscesses, although there has undoubtedly been much improvement in all of these conditions in the last decade.

DIAGNOSIS.

In order to properly discuss the subject of alveolar abscess, it seems necessary that we consider all of the conditions which may

arise as a result of the death of the pulp of a tooth, and I have chosen the classification presented in "The American System of Dentistry," by Dr. G. V. Black, viz.: dead pulp; acute and chronic apical pericementitis, acute and chronic alveolar abscess. Many of the symptoms are so familiar to all that I will only mention those of most importance:

1. *Dead pulp without involvement of the tissues beyond the apical foramen.*—Such a condition gives no pain or discomfort to the patient; the only sign may be the discoloration of the tooth, and even this may be absent. A lamp held to the lingual of the tooth may reveal a shadow in the position of the pulp chamber. The tooth may be badly decayed and the pulp chamber open; there may be caries involving the wall of the pulp chamber without exposure, or the dentin and enamel of the tooth may be intact. The condition may have existed from a few days to a number of years. The pulp tissue will usually be disintegrated and more or less liquefied; occasionally the pulp chamber and canal will be dry and almost empty, the pulp tissue having dried up. It is the duty of the dentist to be constantly on the lookout for such cases and, when found, institute treatment at once and thus prevent possible future trouble. The fact that teeth with dead pulps will often go for years without the patient's having any symptom and occasionally one will, when opened, result in the formation of a violent acute abscess, is no excuse for allowing a tooth with a dead pulp to go without treatment.

2. *Acute apical pericementitis, in which the tissues outside of the end of the root have become involved in an acute inflammation on account of the death of the pulp, but in which tissue no pus has formed.*—This is the intermediate stage between dead pulp and alveolar abscess. There is very slight or no increase in the pulse or temperature. The tooth is tender to pressure and there is dull pain in the region. The tooth becomes elongated and the pain more severe, throbbing. The surrounding mucous membrane becomes inflamed and tender to pressure. The symptoms gradually become the symptoms of alveolar abscess as the formation of pus begins.

3. *Chronic apical pericementitis, in which the apical tissues are involved without severe or acute symptoms and without the presence of pus.*—This condition may continue almost indefinitely

without acute symptoms, or it may become acute at any time. Such a condition is frequently caused by the projection of root filling material beyond the apical foramen, or by a failure to thoroughly cleanse the canal before placing the root filling. The number of these cases occurring in one's practice reflect upon the technique of the operator.

4. *Acute alveolar abscess, in which pus has formed in the apical tissues, accompanied by the symptoms of acute inflammation.*—The symptoms are those of acute apical pericementitis, which become more severe, plus the other symptoms accompanying pus formation. There is often rapid pulse and high temperature, which may be preceded by a chill. In most cases the temperature will be from 101 to 103, although temperatures above 105 have been recorded. The submaxillary gland on the same side is enlarged and tender, and the cervical lymph glands may often be palpated. The pus will usually destroy some of the central portion of the bone first, as it offers least resistance. When it reaches the periosteum it may penetrate it directly or it may burrow under it, thus lifting the periosteum away from the bone, occasionally resulting in necrosis. When the pus gets through the periosteum into the soft tissues there is usually a diminution of the pain with an increase of the swelling, since the pressure is relieved with the escape of the pus from under the periosteum, and the soft tissues permit the inflammation to become diffused. During the time that the pus is beneath the periosteum palpation will often reveal only induration without fluctuation, although there may be fluctuation, especially if a considerable area of the periosteum has been lifted. After the pus has penetrated the periosteum there is usually fluctuation. In cases in which there is present an area of fluctuation without other concomitant symptoms of abscess and there is any doubt about the diagnosis, a grooved exploring needle should be passed into the tumor to determine its contents. This is a good precautionary procedure in cases where the swelling is over an artery of considerable size., to avoid the possibility of opening an aneurism with the knife. The direction of the burrowing of the pus will usually be governed by the resistance of the tissues and by gravity. Occasionally it will follow along the pericemental membrane between the alveolus and the root and discharge about the neck of the tooth. Generally the pus will find its way through

the periosteum and gum to the labial or buccal of the alveolar process, although occasionally the opening will be through the skin on the face, chin or neck, or from the upper teeth into the nose or antrum. I cared for a case about a year ago in which the discharge from an abscess from a lower third molar penetrated the bone to the lingual, following along the lingual side of the bone below the attachment of the milohyoid muscle until it reached the lower border of the bone below the position of the cuspid and then came upward fully half an inch on the outer side of the bone before it penetrated the periosteum, I remember a case that came to Dr. Gilmer's clinic two years ago with an abscess from an upper right lateral incisor that was discharging through a sinus on the side of the nose on a level with the inner canthus of the eye.

5. *Chronic alveolar abscess, in which pus is present in the apical tissues without acute symptoms.*—There is usually a sinus from which there is either a continuous or intermittent discharge. It is probable that most failures in the treatment of chronic abscesses result because an exact diagnosis is not made. The most important thing to know is the condition of the pericemental structures, and particularly how much of the pericemental membrane has been detached, together with the condition of the root end. If there is any question as to the direction of the sinus a soft, blunt-ended silver probe should be first used to explore it. Then a sharp, stiff steel probe, first suggested by Dr. Thomas L. Gilmer, of Chicago, should be passed along the sinus to the root. With such a probe the diagnosis is usually easy. After coming in contact with the root the probe may be passed over the surface of the denuded portion, determining its outline and the extent to which the pericemental membrane has been destroyed. It is also easy to feel deposits or serumal calculus on the root or areas that have been roughened by absorption. With the same probe the condition of the surrounding bone may be determined. If it is normal, the probe will penetrate it slightly; if it is soft, carious, the probe will penetrate it as it would unvulcanized rubber; if it is hard and rough, necrotic, the probe will not penetrate it at all, and its roughened surface will be discovered. A cavity in the bone would, of course, be noticed also. The soft silver probe is prac-

tically worthless in comparison with the sharp steel probe in the examination of the hard tissues in these and similar cases.

In cases in which there is a discharge of pus at the gingival margin a thin, flat explorer with a dull end should be passed between the soft tissues and the root to determine the extent of the detachment of the pericemental membrane. All of these instruments should be sterile when used. It is impossible for me to understand why so many men hesitate to use a probe and make thorough explorations. I have seen many cases where chronic abscesses have been treated for months and years without the slightest improvement and without a probe having ever been used to determine the exact condition. The X-ray may occassionally be used to advantage in determining the extent to which the bone has been destroyed, but more particularly to ascertain the condition of a root filling, or if anything projects through the apical foramen, in cases in which there is no sinus.

While in the majority of cases the diagnosis is not difficult, we should, in the consideration of many cases, obtain as full a history as possible from the patient and from our own records, or occasionally from the records of another dentist. In many cases we may gain important information from the patient as to the time when attention was first called to the tooth, report of pain and tenderness, sensitiveness to thermal changes, particularly following filling operations, history of any previous inflammations in the same region, or of any injury suffered, previous treatment, etc. This should be followed by a careful examination of the teeth and surrounding soft parts to determine the exact conditions. This examination should consist of careful inspection and palpation, accompanied by thermal tests, tapping to determine the involvement of the pericemental membrane, probing with soft blunt or sharp steel probe, use of the X-ray or exploratory puncture, as the case may require. In acute cases it should be the rule to take the temperature and pulse, as they are often a better guide than the local symptoms.

I wish to call attention to the fact that sinus is a better word than fistula, as applied to the tract by which pus escapes from an abscess. All authorities give the one definition for sinus, viz., a long, narrow canal communicating with an abscess, while most authorities give a double application of fistula, viz., the same as

sinus, but preferably a canal connecting a normal cavity with the surface and therefore discharging a normal fluid, such as saliva or urine, and not a pathologic fluid such as pus. While it is not positively incorrect to use the word fistula in connection with an abscess, sinus is certainly more exact. My attention was first called to the definitions of these words by Dr. Thomas L. Gilmer several years ago.

TREATMENT.

The treatment of the conditions under discussion naturally divides itself into the treatment of the pulp chamber and canals, and of the tissues external to the tooth, in addition to the constitutional treatment. Let us consider first the pulp treatment.

No matter what the condition presenting, the rubber dam should be placed whenever practicable and the field of operation sterilized by swabbing the parts with a good antiseptic, such as oil of cloves, before any operating is done in the pulp chamber, and before the rubber dam is removed the cavity should be absolutely sealed. At each subsequent sitting the rubber should be in place and the field sterilized before the cavity is exposed and the cavity should be again sealed before the rubber is removed. Nothing should be allowed to get inside of the pulp chamber except what the operator puts there. Many men seem to hold the opinion that in removing infected and disintegrated pulp tissue there is no necessity for using a sterile broach. This is wrong, for the reason that the unsterile broach may carry in a much more virulent organism than those present, and thus greatly increase the inflammatory condition.

It is my practice to thoroughly cleanse mechanically the pulp chamber and canals in all cases at the first sitting, or as soon as the soreness of the tooth will permit. The only exception I would make to this is in those cases where the chamber and canals are dry and the pulp tissue dried up. In such cases I would seal in an antiseptic first and remove the pulp at the second sitting. But where the pulp is decomposed and the contents of the canals is more or less liquid. I think less of this infected material will be forced into the apical tissues in removing it, if proper care is used, than will be in placing a treatment without thorough removal. After removal the canals should be thoroughly sterilized and an antiseptic treatment sealed in with guttapercha, the walls of the cavity having been slightly moistened with eucalyptol. This treat-

ment will then have the best possible opportunity to control the inflammation that is present or that may occur in the apical space.

It is my rule to leave treatments in a week, unless there is indication for an earlier change. Following the removal of a dead pulp, it is often necessary to change the treatment sooner, occasionally in less than twenty-four hours. The general tendency in the profession seems to me to be to overtreat, to change the treatments too frequently. These two points cannot be too strongly emphasized: the positive sealing in of all treatments and the rule of allowing them to remain a week. Teeth from which dead pulp has been removed will often be more or less sore and painful during the next twenty-four or forty-eight hours, but these symptoms will usually subside if the case is not disturbed. If the symptoms should be sufficiently severe, necessitating the removal of the treatment, the rubber dam should be put on and the new treatment sealed in. It is too common practice to remove a treatment and allow the pulp chamber to remain open a day or two, resulting in a repetition of the pain and soreness when the cavity is again sealed. Thus many teeth are treated for months and years without success. My records of all cases in which I have removed dead pulps show that the root fillings were made in about seventy per cent of cases within two weeks after the pulps were removed and, in an additional seventeen per cent, within three weeks, leaving only thirteen per cent that were treated longer. I do not see how it is possible to get better results by an extension of this treatment over a long period of time. All that can be accomplished through the root canal can generally be accomplished within two or three weeks, and at the end of that time I fill the canal and await developments with the feeling that if the case does not heal it will be due to some condition outside the root, which will need treatment through the process.

Cases of acute or chronic apical pericementitis require little difference in treatment from the simple cases of dead pulps. It is generally an advantage to raise the bite to relieve the occlusion on the sore tooth, and frequently local counter-irritation and constitutional treatment, as for alveolar abscess, should be employed.

In the treatment of acute alveolar abscess I wish to emphasize two things: the lance should be used early, often before pus can be

definitely palpated; and it should go deeply enough to penetrate the periosteum. Early incision will assist the pus in finding an exit and thus give the patient relief at the earliest possible time. If the incision is carried through the periosteum it will frequently prevent it from being lifted from the bone, which might result in necrosis. The incision should be kept open by packing with gauze. Cloths dipped in water as hot as can be borne and applied to the face will often relieve the pain. Saline cathartics should be given in all cases, also a hot foot bath before retiring, and anodynes when necessary.

Chronic alveolar abscess should be treated in accordance with the findings of a careful diagnosis. I believe the common practice of forcing any medicine through the tract under pressure does more harm than good in many cases; if much of the pericemental membrane about the end of the root has been destroyed, such treatment is inadequate; and if this membrane is intact, medication is unnecessary, as the case will heal as readily without it as soon as the dead pulp is removed. Hydrogen dioxid is a dangerous drug to use in the treatment of these cases, as it is apt to force the infection deeper into the tissues as it expands.

If the pericemental membrane about the end of the root has been destroyed and that root has been bathed in pus for a considerable time, or if the end of the root has been roughened by absorption, or if it is covered with deposits of serumal calculus, the case will rarely, if ever, be cured while that root end remains. If easy access may be had to the root through the process, and the tooth is not much loose in its socket, there is a chance to save it by resecting—cutting off the end of the root after filling the canal, thus removing the cause of the continuation of the abscess. If it happens to be the lingual root of an upper molar the entire root may be amputated; or one root of the lower molar may be extracted, after having been separated from the other roots. These operations are simple and should be performed by any dentist. Frequently the best treatment will be the extraction of the tooth.

In case the root end is not much involved, the destruction of the tissue being largely in the bone away from the root, then the sterilization and filling of the root canal is generally the only treatment necessary. Those cases in which the pus has followed along the

side of the root, discharging at the gingival border, are generally hopeless.

If there is a cavity in the bone it is a good plan to scrape or curette it, freshening its surfaces. If the surrounding bone is carious, all of the softened bone must be removed to effect a cure. Occasionally a small piece of bone will have become necrotic and separated from the healthy bone, thus causing the continuation of the abscess. We should be on the lookout for such pieces and remove them. Whenever a cavity of considerable size or depth is found or made in the bone it should be packed and irrigated frequently, to keep it in good condition while it heals from the deepest part. A mild antiseptic solution is sufficient for the irrigation and there is nothing so good as iodoform gauze for packing.—*The Dentist's Magazine.*

ON THE ABUSE AND INDICATIONS OF PORCELAIN AS A FILLING MATERIAL. By J. F. F. Waltz, D.D.S., Decatur, Ill. No one can seriously deny porcelain an important position among our filling agents so long as we have absolutely nothing to take its place as a permanent filling where esthetic requirements are nearest satisfied. We have little faith in the durability of silicate cements, however much we might wish it in view of their ease of insertion and improved appearance when compared with most porcelain fillings. Surely porcelain has demonstrated that its use is not due to temporary enthusiasm nor can rightly be called a fad. The conservative dentist never considered it a passing fancy, as it frequently asserted, for its use dates back for more than twenty years, during which time, with gradual improvements in material and application, a record has been made that clearly proves it is a material of much merit when rightly used within its limitations. Were it not for this period of service we would not today have it so near a standard filling agent with definite indicated cavities in which it should be inserted—and in which it should not be inserted—nor would there have sprung up the many appliances and contrivances for the technical part of its use.

Real opposition to porcelain fillings has arisen mainly through incompetence in its manipulation and application. The foremost cause of failure is to be attributed to the fact that it may be used for fillings only as an inlay. With its increased use dentists found

their cavity preparation had to be made along more or less unfamiliar lines. So great were the blunders made in this one feature of the new work that much discouragement of the entire method resulted. No operator who lacks appreciation of the requirements of the inlay principle of filling can use porcelain without abusing it and making his work liable to ultimate failure. Dr. Cook in his excellent report of the committee on Dental Science and Literature last year calls attention to the noticeable lack of any uniform or definite methods in cavity formation to be found in all the writings upon the porcelain inlay which his committee examined. The experimental stage with its confusion is rapidly giving way to known conditions with definite methods of procedure throughout all parts of the work. Let no one seek to discourage another until convinced that he personally should bear no blame and that his application of the material was made along approved lines of practice so far as they exist.

Probably the widest abuse of porcelain is made through inappreciation of its most detrimental physical property—its brittleness or friability. It must have considerable bulk to possess sufficient strength and the edges must never be projecting or thin. To use it in the occlusal surfaces of the posterior teeth is now generally conceded to be too hazardous to be countenanced as good practice—neither should it be abused by placing it in exposed positions in mouths where the teeth are massive and show marks of unusually severe force used in mastication. We all recognize these mouths—usually in men—and have been witnesses of failures in gold when the abnormal strain to be borne was not taken into account.

Again we are apt frequently to set a filling which if made another time would be of better color or would fit more perfectly or would be entirely free from some imperfection of baking—as a bubble for example—clearly this is an inexcusable abuse, since in knowing at this stage whether the filling is as it should be or not lies an unique opportunity to approach nearer perfection in the finished work.

Porcelain fillings are indicated wherever we wish to avoid the unsightly appearance of other filling agents and would expect durable service from such a friable substance. Hence we at once appropriate to our field all labial cavities and conspicuously placed buccal cavities. In these positions it not only prevents disfigure-

ment of the patient but does away with the infliction of the dam and its oftentimes barbarous cervical clamps. In large cavities in these localities is porcelain especially indicated.

Next, in all simple anterior approximal cavities of such size as to be disfigurements when filled with gold, porcelain is most indicated. These can often be entirely filled from the lingual surface, making the work wholly invisible under usual conditions.

Proximoincisal cavities in the six anterior teeth call for porcelain really the most, as they increase in size. Fillings of any kind to be serviceable in these cavities require care and much ability on the part of the operator. Porcelain is a great aid in this field, where much bulk can be obtained without concern as to the amount of filling showing in the completed operation. Unfavorable occlusion must be taken note of and sound judgment sometimes decrees gold a better agent because of its strength.

Extended labial and buccal abrasions of eroded surfaces are treated very simply with porcelain often when any other agent would apply with difficulty.

In mesial and mesioocclusal cavities in the bicuspids and molars without an adjacent tooth and without an antagonist we find porcelain the most indicated material.

For incisors and cuspids broken extensively through accident, or badly malformed we have no restoring agent which serves the purpose better than porcelain.

A recent use for porcelain has come in its combination with the cast gold inlay in those cases where considerable gold would be hidden by forming in the wax model a cavity embracing the exposed portion, into which, after the gold has been cast, a low fusing porcelain is baked, making in effect a bit of work similar to the enamel work of the jeweler.

So strongly should the importance of porcelain as a filling material be urged that no ambitious member can longer defer making use of it in its proper sphere—if he has not previously done so. Neglect to take up this material may have been pardonable some time ago, but at this time we do not see that any practitioner of repute can justify indifference to one of the most valuable filling agents at our command.—*Dental Review.*

THE PRINCIPLE OF RETENTION FOR CAST GOLD INLAYS. By F. T. Van Woert, M.D.S., Brooklyn, N. Y. The principle of retention for cast gold filling differs so greatly from that for any of the other fillings that I fear it will be some time before it is generally appreciated, and until it is, cast gold will not hold its proper position as the most practical and nearest the ideal of all the methods for the restoration of lost tooth structure. And it is the purpose of this discourse to prove the truth of the above statement and if possible bring about the general adoption of this most wonderful method of filling teeth.

That we have entered upon a new era in the practice of dentistry is beyond argument. Dr. Jenkins' perfection of the porcelain filling opened the way for a display of our talent in the arts that was impossible before.

The utilization of porcelain, together with Dr. Taggart's method of gold manipulation, places us in a position to demonstrate to our patients that we are masters of the situation, and the result must be an appreciation which in turn will be productive of a more equitable compensation for our services than has existed in the past. There is probably no class of professional men so poorly or disproportionately paid for their skill and downright hard work as the members of the dental profession. The labors have been so arduous that many break down and are cut off in their prime.

Two or three large gold fillings of the old type, if properly inserted, would be enough in one day to physically incapacitate the operator for anything but a bed and several hours' absolute rest. Such work curtails and restricts opportunities for anything but a fair living and perhaps saving enough to maintain one, if economic, in old age if fortunate enough to live to that state.

On the other hand, the new method of cemented fillings makes possible at least three times as much work with half as much nerve strain and fatigue. My deductions on cavity formation are based upon clinical experience dating from February, 1907, to the present, beginning about one month after Dr. Taggart had introduced his method to the profession.

In the beginning my cavity formation was identical with that for porcelain or the gold inlays as made by Drs. Hinman, Nyman, Dills and others, but I soon found it necessary to adopt a distinctive type for the cast gold. The particular feature which

brought this to my attention was the possibility of securing an absolute occlusion, a result impossible with any other method.

CAVITY FORMATION.

Extensive dovetailing or undercutting I found unnecessary, and the complication of steps and fissures a decided detriment for a successful result, and where walls are at right angles they should be prepared with curved lines rather than the sharp square so common in the step form. First, because there is less liability of fracturing the enamel; second, the chances of securing an accurate impression or wax reproduction of the cavity are very much improved; third, any little defects in the casting are usually corrected without a sacrifice of any of its other parts; fourth, a more accurate butt seam may be secured with comparatively little trouble. My experience with a lap seam has been anything but pleasant. Fillings of this kind usually come to grief, particularly at the cervix. Gold differs from other metals usually cast in that it is much more malleable, and I believe this property increases with its use in the mouth, under the stress of mastication. Personally, I believe an alloyed gold preferable to the pure. It certainly adds very much to the retention of such a filling.

A very important consideration in preparing a cavity for cast gold is a possibility of encroachment upon it in repairing defects in the same tooth which may develop later. If too great extension has been made for retention, it is liable to necessitate the removal of the entire filling later. If the inroads of caries has proceeded to such an extent that it encroaches upon a field which would be necessary in the anchorage of another filling, I believe in extension for prevention. Where the extension for prevention has been carried into the opposite approximal surface I believe it is often a decided advantage to remove this portion of the tooth to prevent a recurrence of decay down on the other approximal wall. But instead of carrying the cavity down to the cervix, as has been done on the other side, it is extended partly below the point of knuckle. My observation leads me to believe that the majority of cases of caries start at a line just below the point of approximal contact; therefore if there is no decay on that surface at the time of making the filling, I believe it perfectly safe to cut only below that point, and the balance of the tooth need not be encroached upon for any prevention.

The six anterior teeth require a cavity formation which places a stress upon the greatest surface of the gold wherever possible. Few centrals or laterals are thick enough to permit slotting the incisive edge, as is often suggested. Many of the illustrations appearing in the text-book show cavities of that character, viz., with the step cavity having a slot in the incisive edge. Any of the six anterior teeth having sufficient room for slotting in that way are so seldom found, that it is hardly worthy of consideration. I believe a cavity can be prepared so that it will retain a filling, yet avoiding any such mutilation of a tooth as that represents.

Importance of Correct Occlusion.—The retention of cast gold fillings lies as much in the occlusion and the restoration of knuckle as it does upon the cavity preparation or cavity formation. In other words, I believe that if a cavity be so formed that a filling when placed in it has an even stress upon every portion of its surface, the act of mastication will drive that filling into place, and it will require very much less anchorage than in any other way.

The theory of extension for prevention as promulgated by Dr. Black is an entirely different proposition from that of extension for retention of cast gold fillings. As I stated before, there is a fixed point at which caries usually sets in, and if that particular point is eliminated the chances are nine out of ten—yes, ninety-five out of one hundred—that with proper care there will never be a recurrence in that vicinity.

Butt Seam Preferable to Lap Seam.—If the filling comes down square against the surface, that would be a butt seam; if, on the other hand, that surface is beveled off and the gold allowed to run over it, with the idea that, being thinner at the point, it could be more easily burnished, which is the object for making a lap seam, then I believe that this filling is bound to change somewhat in its molecular formation and by the stress of mastication. The chances are it will separate at that point later and leave an opening for the collection of bacteria and the recurrence of decay. On the other hand, with a butt seam, it is utterly impossible to cause any such defect.

Another advantage of the butt seam over the lap seam is that you do not weaken your wall. Wherever they are beveled for the purpose of making a thin edge, for the purpose of burnishing, you

not only weaken the filling, but the walls of the tooth to which you attach it.

Choice of Gold.—The question of retention depends, as I have said before, upon the occlusion as much as on the cavity formation, and another very important factor is the gold which is used for making the casting.

Dr. Taggart advocates the use of pure gold, and quite a number of others do so. I prefer non-oxidizable gold to anything else, because it does not change color. This alloyed gold costs practically the same as pure gold, but while it is soft enough to be burnished it is hard enough so that it will not change under the ordinary stress of mastication. I believe that it casts fully as well as the pure gold, and, being a little harder, or of a different texture, so to speak, it will stand up better and be the means of helping the maintenance or retention of that filling, quite as much as the occlusion, the knuckle and the cavity formation.

Another factor that plays a very important part in retention is this—if the restoration of knuckle between the bicuspid and molar is not thoroughly established, I do not care how well that filling is made, nor how well the cavity is formed, there will be some trouble, even if it is no more than the breaking down of the edges. I believe that if the filling is properly knuckled, so that it comes in proper contact with the adjoining tooth, that will contribute greatly toward the retention of its filling.—*Items of Interest.*

SOME DISEASES OF THE ORAL CAVITY AND THEIR SURGICAL TREATMENT.—By Legrand M. Cox, D.D.S., St. Louis, Mo. The object of this paper is not to burden you with new and unproven theories of oral surgery, but merely to impress more firmly upon you the recognized methods of obtaining the best results in diseases with which the general practitioner of dentistry should be most familiar. Since, as Dr. Gilmer says, "The mouth is the legitimate field for the dentist, and he does not fulfil his entire duty to his patients until he becomes familiar with all its diseases," there is no excuse for a dentist not knowing the surgical treatment of the most common diseases met with and at least having an advising knowledge of those less commonly seen in the practice of dentistry. The following cases represent those of the

most usual type of their class with the treatment generally accepted by oral surgeons.

Root Amputation for the Cure of a Persistent Alveolar Abscess.—An alveolar abscess is a collection of pus located within the alveolus. They are usually caused by the expulsion of gases into the alveolus from a decomposing pulp. Under this pressure of expulsion the pericemental membrane distends and thus becomes the wall of the abscess. The nature of an abscess is determined largely by the rapidity with which it develops, and while the treatment in all cases is essentially the same, it must be varied at times to meet different complications.

Root amputation is indicated under the following conditions, namely, inaccessible root canals, chronic abscesses where there becomes a condition of caries of the alveolus, and roughening of the apical portion of root and it does not yield to the chemical cauterization of the diseased area. The field of operation is still further limited by the location of the tooth thus affected. Resection of roots are usually confined to the incisors, cuspids, bicuspids and mesial roots of the first lower molars. Occasionally the lingual roots of the upper molars become partially or wholly denuded in pyorrhea and resection of them is then indicated.

Treatment.—Carefully sterilize and fill root-canal and after using a local anesthetic, a circular incision is made in the gum over the diseased area with a trephine through process to root, a hole is now drilled along the distal side of the root with a pointed dentate fissure bur at the point where it is desired to amputate, and by carrying this bur mesially, the end of the root is completely cut off. The resected end is dislodged by a spoon excavator. The pocket is now thoroughly curetted with this excavator and the end of remaining root edges are rounded with a bone bur and the cavity is irrigated with a warm antiseptic solution and packed with iodoform gauze. The irrigation and packing is continued for a few days. The packing should be more loosely applied each day or so, allowing the granulations to fill from the bottom outward. When the reparative process and the upbuilding is fairly begun, care must be exercised not to use too much force in washing out, as the granulations may be easily hindered or destroyed.

Ranula.—Ranula is a cystic tumor beneath the tongue, caused

by the closure of a mucous duct at or near its orifice. This may be due to an injury or a calcific deposit in the duct. The mucous membrane covering the fluid contents of this cyst is smooth, frequently of a bluish color and assumes a peculiar mottled appearance, closely resembling a frog's belly, hence it has derived its name of ranula. Formerly, ranula was supposed to be caused by the closure of a salivary duct, but more recent observations indicate that it has no connection with the salivary glands or ducts, but results from the closure of the duct from some one of the mucous glands in the floor of the mouth, or the Blandin and Nuhn gland situated on the under surface of the tongue. The contents become a thickened, glairy, viscid fluid and increases to the size of a hickory nut and even larger in some instances. They are unilateral and generally occur between the ages of twenty-five and forty.

Treatment.—If in its incipiency, the method advocated by Dr. T. W. Brophy, and the one the writer usually employs, is accomplished by taking a small silver tube and perforating it with holes, then bending it so as to form a ring about one-half inch in diameter. This is an open ring, one end of which is carried into the cyst and out through the mucous membrane and telescoped into the other end, thus uniting the ends of the tube and completing the ring. The perforated ring thus introduced will admit the mucous of the cyst and allow it to escape through the tube and into the mouth. The ring must be rotated daily, else the tissues may fill the openings in it, thus defeating the object of its insertion. The tissues around the ring will become smooth, and in a few days permanent openings will be established, after which the ring may be removed. However, if the cyst is of longer standing and the fluid contents thickened, the complete excision is the surest and shortest way to effect a cure, as it cannot be enucleated on account of the cyst wall being so delicate and firmly attached. Excision is not applicable in all cases and the partial extirpation is the one usually resorted to, which consists in excising a large part of the cyst-wall, after which the cavity is packed with iodoform gauze to prevent the healing of the incision. The gauze packing is changed daily until the margins of the wound have healed, thus securing a free and permanent outlet for the duct.

Fibroma of the Gums.—Formerly all tumors of the gums were

included in the term "epulis." The term "epulis" should be restricted to designate a superficial elastic tissue-growth originating from the gums, or from the pericemental membrane. This term is entirely discarded by some oral surgeons at the present time.

Fibroma of the gums is a benign tumor composed of wavy bundles of fibrous tissue, the cells of which are long, slender and ordinarily packed closely together, the mass being permeated with distinct blood-vessels. They originate in the periosteum, usually in the region of the anterior teeth. They are often pedunculated but may have a broad base, in which case they resemble a bone tumor. They are a slow growing tumor, unaccompanied by pain, and cause no direct symptoms, except an occasional displacement of the teeth, caused by the pressure in the enlargement of the growth. They vary in size from that of a pea to a walnut. However, they have been known to attain greater magnitude.

At times during their development, it is very difficult to differentiate between a fibroma and a malignant growth, without a microscopic examination, under which conditions a clipping should be made and examined to verify the diagnosis.

Old age predisposes to epithelial tumors, while the aptitude for fibroma is lessened after the age of thirty-five years.

Treatment, Always Operative.—After the extraction of one or more teeth, the excision of the alveolar border around the fibroma can best be removed by a long dentate fissure bur in the dental engine, following with a chisel or bone forcep if necessary, for the complete extirpation of the parts involved. If completely removed in its early stages, together with all the periosteum connected with it, and a part of the alveolar process, it will not return.—*Dental Era.*

THE ACCESSORY SINUSES AND THEIR RELATION TO STOMATOLOGY. By S. MacCuen Smith, M.D., Philadelphia. Before specifically dwelling on the subject of my paper, I beg your indulgence in calling attention to the relationship between general medicine and dentistry, with a view of showing that the latter is as much an intrinsic part of the former as any other recognized branch of medicine; furthermore, the statement cannot be controverted that the science of stomatology is relatively of

equal importance to suffering mankind. It is likewise true that in the recent past there was no branch of the healing art that became so entirely separated from general medicine as that of dentistry. So marked, indeed, had this gradual severance of the child from its maternal protector become that its logical habitat, as well as the innate obligation of the offspring to its parent, was almost forgotten; the natural result being that dentistry, as a profession, was, in the minds of the public, separated from general medicine quite as distinctly as that either of law or theology.

To you, gentlemen, who practice the art of stomatology, I attribute this unfortunate "parting of the ways," not, however, that this was your expressed wish, nor that your best judgment dictated such a course, but solely from the fact that the practical and scientific part of your work made such phenomenal progress that in time it became quite impossible for followers of general medicine to digest the pabulum of your scientific research; how much less, therefore, was our ability to utilize, in practical life, the findings thereof. The day has long since passed when one mind is great enough, or one life is long enough, to grasp the broad domain of general medicine. In order, therefore, that our fellow man may enjoy the greatest skill obtainable in everything appertaining to the healing art it became necessary to divide medicine into several branches.

The wise and far-seeing minds that controlled the destinies of dentistry were early and energetic workers in the field of knowledge, and planted therein the seeds of industry and progress that year after year have grown stronger and stronger, until finally the mature, elaborated product has astonished the civilized world, not alone for its brilliancy, but for its practical execution and technical skill.

Those of you who practice your chosen profession in this old City of Brotherly Love must feel proud of her traditions, for it was here that you developed and from this cradle of liberty that you sent forth to all parts of the globe the greatest practitioners of the dental art, the best scientific investigators of stomatology that the world has ever known. So well recognized were these masters of their profession that their pupils were called to administer to the wants of the crowned heads of all civilized countries, thus establishing and perpetuating throughout the world the

phrase *"American Dentist,"* a name that stands for the highest artistic skill—a skill and cleverness that at one time could not elsewhere be duplicated.

With the great advances made in the science and art of medicine and surgery, and their application to the correction of abnormalities in mankind, it became manifest that, after all, the human economy is one homogeneous structure, comprised of various molecular elements, these in turn forming the several organisms that go to make up the human body. Although this perfected structural unit is comprised of many parts, each having a special function, yet all are interdependent one upon the other for harmonious action. It is a grave error, therefore, for those of us who make a special study of certain diseases or parts of the human structure to regard the same as a heterogeneous mass or bundle of disimilar elements, to be separated into various *isms*, each to be treated without due appreciation of its relation to others or to the human body as a whole. This fanatic attempt to dismember medical science, and especially to individualize the human economy, is bound to react to the great detriment of our patients, unless, in the first place, we insist on a well-rounded, adequate preliminary education, which in turn must be followed by a broad, comprehensive general medical training. When a firm foundation of this character is once established we will have sounded the deathknell to the claims of certain enthusiastic practitioners, who, disregarding the homogeneity of our ante-mortem state, see all pathologic conditions through the eye, the ear, the throat, the nose, the teeth, the rectum, etc., being unwilling, apparently, to concede that such disease is very frequently only a local manifestation of some general ailment.

While this criticism is still justifiable when applied to a certain portion of our profession, it must not be forgotten, on the other hand, that the vast majority are fully cognizant of the importance of the relation of one organ to another, both in health and disease, and also fully appreciate the fact that their combined normal functional activity expresses the embodiment of perfect health, such as is manifest in the equipoise of both mind and body.

It is important that we briefly review the anatomy of the parts under discussion. The antra Highmoriani are two large cavities, pyramidal in shape, situated each in either body of the two

superior maxillary bones, and communicating with the middle meatus of the nose by a circular opening, the ostium maxillare, behind which is sometimes found a second opening, the ostium maxillare accessoris. The nasal mucous membrane extends in through the opening to line the maxillary sinuses. The floor of the antrum is formed by the alveolar process, the roof by the floor of the orbit, the external wall by the facial surface, and the posterior wall by the zygomatic surface of the superior maxillary bone. In several places these bony walls of the antrum are extremely thin, and therefore any undue pressure exerted upon them by accumulations within the cavity will produce bulging, and should the accumulated fluid or pus not be evacuated early, perforation is likely to follow. The points at which the walls are particularly thin are immediately above the canine fossa; upon the buccal wall, above and between the roots of the first and second molars; above and between the lingual roots of these molars, and the orbital floor. In the posterior wall are situated the osteal canals, which transmit the posterior dental vessels and nerves. Cryer has pointed out the fact that anomalous branches of the superior dental nerve occasionally cross along the floor of the antrum, the only protection being a thin layer of mucous membrane.

Abnormalities in the size and situation of the antrum of Highmore are of very great importance in studying the pathologic conditions affecting this sinus. It has been demonstrated by anatomic preparations that great variations in the size and shape of this cavity, as well as in the thickness of its bony wall, exist. In some cases the cavity is very small, while in others it may be three times the natural size and extend under the floor of the nose, as has been shown by Cryer. Indeed, so often do these variations occur that in an examination of many skulls it would be impossible to find two exactly similar. This condition prevails, also, in the cavities of the temporal bone. In many cases the floor of the antrum is penetrated by the roots of the first and second molars, and occasionally by the second bicuspids as well.

In the present state of the healing art, the theme of this paper can no longer be regarded as strange or unusual, for today we are inclined to attach a far greater importance to the relation of the accessory sinuses to the condition of the oral cavity and the teeth

than at any other period in the history of medicine. A study of medical literature reveals the fact that the care of the teeth is no modern acquirement. The Egyptians were skilled dentists, and the Arabians (Abulkasim) placed on record their belief that great care should be devoted to the teeth, "as they do not grow again." According to Abulkasim, the substitute for a lost tooth consisted of a portion of bone which was fastened with gold. Ambroise Paré was familiar with the transplantation of teeth, but the method was more scientifically tested by L. Guyon in 1615.

In no other region of the human organism are so many diseases and infectious processes manifest as in the mouth. In part, these are purely local affections, such as caries of the teeth, ulcers, suppuration of the gums, etc.; again, they are accompanying phenomena of general maladies, such as syphilis, influenza, the exanthematous diseases, etc.; finally, they are pathologic processes, which, either in their local expression or in their sequelæ, must be considered as of exceedingly serious import to the entire organism, such as Rigg's disease, necrosis of the jaw, diseases of the lungs, of the digestive tract, of the eye, of the ear, sepsis, etc.

The relations between the oral cavity and other parts of the human body are exceedingly numerous. First, by continuity of the mucous membrane of the mouth and of the accessory sinuses; second, by diseased roots of the teeth, through which a path is opened for the entrance of bacteria and their products of decomposition into the bone, where they give rise to local affections, or are carried by the lymph and blood streams to distant organs, where they generate new foci of disease; third, through the ducts of the salivary glands, the Eustachian tubes and the tonsils, all of which present an easy mode of entrance for the microorganisms of the mouth; and, fourth, the relation of the cavity of the mouth to the lungs and the digestive tract is no less intimate. It can easily be understood how deep inspiration may dislodge particles of mucus and saliva from the oral mucous membrane, carrying with them innumerable bacteria, which are thus introduced into the lungs. When we recollect that the specific organism of croupous pneumonia is an almost constant inhabitant of the mouth, and the tubercle bacillus at least an occassional one, the importance of these facts cannot be overestimated. The constant deglutition of such bacterial masses may very readily produce digestive disturb-

ances. Deficient care of the oral cavity naturally favors such deleterious processes. The connection of the mouth with other parts of the body is extremely varied because of numerous nerve tracts, and thus, in consequence of diseased teeth, severe disturbance may arise, not merely in the course of the trigeminal nerve, but reflexly in remote areas.

These facts are sufficient to show that stomatology must no longer remain a *terra incognita* to the practitioner of medicine. The cases are much too common in which an accurate knowledge of diseases of the oral cavity, and especially of the teeth, are of importance in the diagnosis and treatment of general affections.

An extremely fruitful field, and one that has been but little cultivated, relates to the neuroses resulting from disease of the teeth and of the oral cavity. Spasm and paralysis in the course of the fifth nerve and even of the facial nerve are quite well understood. Flagg has reported paralysis of the face, of the hand, and of the arm, as well as epileptic attacks, due to excementosis, and has observed complete recovery after extraction of the affected teeth. This same author reports a case of total deafness of the left ear, of seven years' standing, which was cured by the extraction of the upper left second and third molars, having no other apparent lesion than a deposit of cement around the roots. Reflex aural pain and disease caused by dental irritation are quite common, the modus operandi being through the nervi vasorum, which come largely from the otic ganglion, while, on the other hand, the inferior dental nerve supplying the decayed tooth or gums also communicates directly with this same ganglion. It will be seen, therefore, that this gives direct nerve communication, through the otic ganglion, between the tooth, which is the source of irritation, and the ear. Sexton of New York, who compiled 1,500 cases of diseases of the ear, states that probably one-third of these owed their origin or continuation, in a greater or less extent, to disease of the teeth.

No doubt Abbott (*Dental Cosmos,* 1889, xxx, p. 81) is partially correct when he states that it is a misnomer to speak of abscess of the antrum, on account of its close proximity to diseased teeth, when an abscess of the same often occurs from a diseased tooth. In cases of this kind he suggests that the term "alveolar abscess" would be more correct. At the same time it must not be forgotten

that diseases of the maxillary sinus frequently occur as an extension of some pathologic process of the nasal chambers, just as readily as abscess formations consequent on bone destruction in the frontal and other accessory sinuses are frequently the result of nasal disease. *Per contra,* chronic antral disease may seriously impair the vitality of the dental roots, or even set up bacterial infection and possibly caries of the neighboring structures.

Another point of great importance, both to the stomatologist and the rhinologist, is the influence of nasal and nasopharyngeal obstruction upon the development of the teeth and palate. Nasal obstruction may be caused by a number of conditions, such as enlargement of the turbinated bones, irregularities of the septum, either deviation or exostosis, foreign bodies, tumors, congenital stenosis of the nares, as well as inflammatory conditions or new growths outside of the nose, causing interference with breathing. The most common cause of nasopharyngeal obstruction in children is enlargement of the pharyngeal tonsil, or adenoid vegetations. It may likewise be produced by large faucial tonsils, inflammatory conditions, new growths, and even too great prominence of the cervical vertebra. It must be remembered that this adenoid tissue, which is otherwise known as pharyngeal or Luschka's tonsil, is a physiologic structure, and is normally present in all children, but in certain cases it seems to be particularly prone to inflammatory conditions and hypertrophy, and it is only when great enlargement takes place that attention is called to it.

The effects of nasal and nasopharyngeal obstruction upon the development of the child, when they occur during the period of growth, are very marked and widespread. The clinical symptoms of adenoid vegetations, or, in fact, any nasal or postnasal obstruction, are well known: the characteristic facial expression, caused by the loss of the labionasal fold; the protruding upper lip with open mouth, receding chin, broadening of the bridge of the nose, hanging of the jaw, alteration in the tone of the voice, impaired hearing, mental hebetude and aprosexia, nasal discharge, the child snoring at night, complaining of headache and of being tired, with frequent attacks of irritability, peevishness and bad temper. Later will be found the high-arched palate, with irregularity of teeth, and deformity of the chest, known as "chicken-breasted," accom-

panied by a characteristic vacuity of expression and dropping of the jaw.

The effects on the general system are usually well marked, the child being poorly nourished, anemic, and showing all the signs of suboxidation. Ziem has demonstrated that nasal obstruction has a marked influence upon the development of the skull in young animals, one of whose nostrils he completely closed up for a long time. There was seen deviation of the intermaxillary bone and sagittal suture toward the shut-up side; also lesser length of the nasal bone, of the frontal bone, and of the horizontal plate of the palate bone, and less steep elevation of the alveolar processes; smaller distance between the anterior surface of the bony auditory capsule and the alveolar process, also between the zygomatic arch and the supraorbital border, also smaller size and asymmetrical position of the vascular and nerve channels on the closed side of the nose. The distance of the two orbits from the middle line was unequal, which, as has been observed in man, leads to asthenopia, astigmatism and strabismus.

Korner has pointed out that two varieties of deformity of the maxilla are found dependent upon the presence of adenoid vegetations before or after the second dentition. When nasal respiration is obstructed in a growing child before the second dentition, the palate assumes a higher elevation, in time, and appears in section dome-shaped instead of slightly curved. The alveolar process forms an ellipse instead of a semicircle, and the lateral portions are approximated, the whole growth of the maxilla is retarded, but the temporary teeth are in their normal position. After the second dentition, however, if the adenoids have not been previously removed, the maxilla undergoes much more pronounced changes. The alveolar processes become still more approximated, the palate more elevated, even resembling a Gothic arch; the anterior part of the alveolar process becomes inclined forward, the lateral halves form an angle at their median junction, and the jaw assumes the V-shaped form so well known. These changes necessitate alterations in the position of the teeth, the central incisors are turned so that their lingual surfaces look toward each other. If the growth has been much retarded by prolonged obstruction, the teeth are crowded out of their normal places. The lateral incisors, and frequently the bicuspids as well, are pushed inward, while the

molars turn outward. Since the lower maxilla develops at the normal rate, it frequently happens that the outer edges of the upper bicuspids strike against the inner one of the bicuspids of the inferior maxilla. In consequence of the elongation of the antero-posterior axis and the oblique position of the incisors, it frequently happens that the incisors do not approximate.

Mouth-breathers are also subjected to pyorrheal conditions from the fact that the mouth is continually open, thereby removing the pressure afforded by the approximation of the teeth, which is so essential to a healthy condition of the dental organs. In some cases mouth-breahting persists even after free nasal breathing space has been obtained by the removal of the adenoids or enlarged tonsils. This is more particularly true in cases where nasal obstruction has existed for a long time and the changes resulting therefrom have become more or less permanent. The force of habit may also have something to do with it, as the moment these patients take their mind off themselves they cease to breathe through the nose and open the mouth. Attention should first be directed to the removal of the nasal or postnasal obstruction, whether it be due to enlarged tonsils, adenoids or any other obstruction, before any attempt is made to correct the deformity of the teeth. After free nasal respiration has been re-established, the patient should be referred to the dental surgeon for the correction of the dental irregularities.

Whitehead has compiled the following theories to explain the direct method by which the nasal obstruction brings about these changes: One is based on the interference which nasal obstruction exerts upon the development of the nose. The hard palate in the fetus lies above the level of the Eustachian tubes; at birth it is on the same plane, and later considerably lower. This is due to downward growth of the hard palate, so that one factor in the production of a highly-arched palate is a lack of development of the alæ of the nose, and more especially of the sphenoid and the septum, while the alveoli and the rest of the face develop at the ordinary rate. This descent of the hard palate is made still more evident when it is remembered that in the infant the posterior nares are almost round, while in the adult they measure twice as much in the vertical diameter as in the horizontal. Any factor which interferes with the development of the child and of the

nasal cavities will retard the proper development of the hard palate and its consequent descent.

Another explanation is that of the lateral pressure which the cheeks, aided by the weight of the lower jaw, exert against the nostril when the mouth is kept open. Some authors regard this as the chief agent in the production of the changes in the upper jaw, and their theory is as follows: The position of the tongue is altered in the habitual mouthbreather. Normally, when the mouth is closed, the tongue lies against the teeth, the palate and the alveolar processes, but when the mouth is open the tongue lies in the lower maxilla, and there is no pressure against the upper maxilla. Before dentition the unopposed lateral pressure of the teeth produces a narrowing and lengthening of the alveolar process, and during both periods of dentition, especially during the second, the processes are still more closely approximated, the maxilla becomes more elongated, the descent of the palate is still further retarded, and the resultant changes in the position of the teeth follow, whereas the lower maxilla develops in the ordinary manner and remains practically normal. The loss of the temporary teeth and the greater vascularity of the maxilla during the period of growth of the permanent teeth are regarded by some as the causes of softening of the maxilla, which explains the marked character of these changes during the second dentition.

Mayo Collier believes that the air stream passing through the mouth and past the nasopharyngeal space produces a negative pressure in the nose, and therefore a positive upward pressure on the lower surface of the hard palate.

It would appear that each one of these theories is partially correct, but that no single one would be sufficient in itself to produce all of these or to wholly explain the production of these deformities. However, in the opinion of the writer, there is no doubt that interference with nasal respiration often produces serious and extensive deformity of the teeth and jaws, and that restoration of nasal breathing will prevent this deformity of the maxilla if seen early, and that at any stage it can be considerably alleviated.—*Dental Brief.*

MODERN TECHNIQUE OF APICOECTOMY: A RADICAL OPERATION. By Robert T. Oliver, D.D.S., Washington, D. C. My subject for this evening is presented with a view of elaborating the operative technique of this simple intraoral procedure, and to stimulate greater consideration for the utilization of modern surgical methods in all operations of this class.

The term "apicoectomy" is derived from two words: "apico," from the word "apical," pertaining to the apex of a root, and the Greek termination "ectomy," meaning excision, a cutting out; taken together it means literally the excision of the apex of a root, *in situ*.

Chronic dentoalveolar abscess, from whatever cause, with or without a sinus, in which septic infection has escaped through the apical foramen and pyogenic bacteria have invaded the delicate tissues of the apical pericementum, with involvement of alveolus by erosive action of pus, any of its various complications, or the more serious sequelæ, are the lesions that usually indicate this operation.

Unnecessary delay in affording relief for these conditions may lead to disastrous results, remedial only after prolonged suffering and systemic debility by wholesale extraction or greater and more destructive operations.

Continued neglect may eventuate in such serious sequelæ as infection of adjacent lymphatic glands, terminating in septicemia (Burchard); a diffusion of streptococci into soft tissues threatening pyemia (Kirk); or the absorption of tubercle bacilli by the lymphatic system, resulting in tubercular degeneration of cervical glands (Cook).

Morbid Anatomy.—It is usual in chronic dentoalveolar abscess for the apex, wholly denuded of pericementum, to protrude into a sinus of varying dimensions, produced in the surrounding alveolus by pyogenic erosion, with the whole area circumscribed by a dense, tough, highly vascular mass of fibrous tissue. This sinus is filled with pus, broken down gangrenous tissue, particles of necrotic alveolus and multitudes of bacteria, the presence of which produces various local and systemic disturbances characterized by unmistakable symptoms.

When the general system is in good condition, *i. e.*, well nourished with compensating metabolism and normal caloricity, the

above-mentioned circumscribed tissue seems to act as a dam to the further inroads of pus or bacterial invasion, but should the systemic balance be overthrown by exposure, disturbed assimilation, or other cause, the effect is readily apparent by increased activity of the abscess; the circumscribed tissue is overrun, and there is a greater loss of tissue, both osseous and soft, that frequently results in necrosis of the adjacent process from denudation and consequent loss of vitality, or by caries, through progressive molecular destruction.

Preparation.—Remembering that these simple intraoral operations are surgical in nature, they should be considered from the highest standpoint of the requirements of modern antiseptic surgery in preventing pyogenic or pathogenic infection; hence strict attention must be paid to procuring and maintaining, as nearly as possible, surgical cleanliness of the mouth, surgical asepsis of the field of operation, and the latest approved methods for sterilization of instruments, sponges, sutures, ligatures and operator's hands.

In all cases where time will permit, the patient's teeth should be thoroughly scaled of salivary deposits, and their surfaces polished.

If this can be accomplished the day before operation, so much the better, but if impracticable it can be done immediately prior to the operation, using extreme care not to lacerate any of the tissues.

As an additional precaution, the teeth should be thoroughly scrubbed with sterilized brush and an antiseptic abrasive, and rinsed with seventy-five per cent ethylic alcohol solution.

For descriptive purposes of a typical case, we will assume it to be one of chronic dento alveolar abscess of an upper incisor, from putrescent pulp, with sinus opening on gum, approximately over the apex, and with open root-canal.

The dressing is removed from canal, and by the use of bristles and graduated Gates-Glidden drills, it is thoroughly cleansed, dried and filled to the end with chloro percha and gutta percha points, being sure to force plenty of material through the apical foramen.

The crown cavity is then thoroughly sealed with gutta percha or oxyphosphates, and a silver-wire ligature (No. 26 gauge) thrown around the tooth at cervical margin, firmly fixing it to the adjacent teeth by a figure of eight ligature.

All instruments used during this step are removed and the hands and mouth sterilized as before.

Operative Measures.—The buccal cavities of each cheek are now tamponed with sterile gauze rolls, and the mouth napkined with square piece of sterile gauze from over the chin, exposing only the three teeth and outer field of operation.

Everything being in readiness, the operator's left forefinger is firmly placed as high up under the lip as possible, immediately above the field, thereby accomplishing two very important essentials, *to-wit*: raising the lip for free view with greater accessibility, and compression of the blood supply.

With a sharp, short-bladed, deep-bellied scalpel, a crescentic incision three-eights of an inch long, with convexity downward, is made through gum and periosteum down to the process. This gives a crescentic flap with its free margin below, which, when raised from the bone, allows it to be slipped under and retained by the left forefinger, still maintaining a constriction of the blood supply, and also, of greater importance, gives the pedicle at the top, from which source the arteries enter, a factor of great import to the vitality of the flap during the subsequent reconstructive period.

The flap being carefully raised from surface of process by periosteal elevators, exposing the middle field, small, tightly wound gauze sponges are dipped in a very hot antiseptic solution, and packed into wound to control the seeping venous hemorrhage.

At this stage, after two or three tightly packed hot sponges, the operator may shift fingers of left hand to avoid cramping, and to prepare for the necessary long pressure to follow.

The middle field, now being comparatively free of blood, the irregular, jagged, sinus opening in the process is observed; this, if fairly large, and approximately over the apex, is enlarged by bur or chisel to uncover apex, and lateral margin of sinus, exposing inner field.

If this opening is not conveniently situated, the large size engine trephine (four millimeters in diameter) is directed over position of apex, and a circular hole cut direct to root. This is enlarged laterally, sufficient to give a general view of inner field, and to facilitate accessibility.

If the hemorrhage can be sufficiently controlled, the protruding

apex, denuded of pericementum, will be observed, sometimes granular from concretions or pits, but more often smooth and eroded; also denuded projections of process, necrotic or carious, are seen or felt, and almost invariably a thick mat of fibrous tissue, partially filling and always bounding the sinus.

A small, sharp, crosscut fissure bur (No. 557, S. S. W.) is now introduced immediately back of the line of denudation, to the mesial or distal surface, as convenient, and by revolving it at a medium speed, with constant pressure, and a slow up and down motion, the root is excised in as near a straight line as possible. A number of these burs should be prepared and changed by the assistant as often as one becomes clogged.

The field should be kept free, from time to time, of all dental, osseous and soft tissue debris, by hot antiseptic irrigation, which also controls venous seepage by contracting ends of severed vessels.

The apical end is removed from cavity, and all denuded or roughened margins of process chiseled out, giving a deep concave, bowl-shaped contour to the cavity.

A Volkman spoon curette, or large round surgical bur (four millimeters in diameter) is now used to scrape out all the contents and smooth all margins down to healthy living tissue, using the smaller size spoons and burs to follow out possible pus ramifications.

The sinus, when clear, should be thoroughly mopped out with a strong antiseptic solution, followed by normal salt solution, and the flap, with periosteum intact, carefully stretched back into position, and held in place, ordinarily, by two or three interrupted, sterilized silk sutures.

Should the abscess have involved a large area of process between the roots of two or more teeth, it often becomes necessary to make a large flap, in which case it is advisable to control arterial hemorrhage by torsion made with hemostatic forceps, and to pack the large cavity with sterile gauze, afterward closing the wound by sutures at each end, leaving an opening at middle of lower border for protrustion of an end of the gauze packing for drainage. The packing is changed each day, diminishing its size to meet the decreasing diameter of cavity by the advance of granulation tissue. As a general rule, however, the cavity left

from the ordinary case of excising the apex of one root is completely closed without drainage, the flap usually uniting by first intention.

The interior of sinus eventually fills with blood, and in the absence of infection tissue regeneration ensues more or less rapidly through processes of granulation, followed by ossific deposits to an extent governed by the age of patient, and the condition of his general health.

The tampons and napkins are removed and replaced during the operation as they become soiled; their final removal takes place after the slight seepage from line of incision has stopped and after the surgical wound and inside of upper lip have been bathed with an antiseptic solution. The lip is then brought down firmly over the wound and held in position, while a strip of rubber adhesive, one and one-half inches wide, cut to fit under and around alæ of nose, is strapped over lip and across cheeks from ear to ear. This precaution is taken to prevent mobility of lip, and consequent irritation of wound.

Subsequent Treatment.—Subsequent treatment consists of having the patient use a hot antiseptic mouth wash once every hour, while awake, during the succeeding twenty-four, without attempt to get it in contact with wound.

The upper lip must be kept immobile, rest and quiet being insisted on; and liquid diet prescribed every three hours, to be introduced per spoon well back in mouth to prevent possible contamination of wound.

Each day lip strap is carefully removed, lip raised, wound and inside of lip bathed antiseptically, and lip restrapped.

The sutures are usually removed about the fifth day, but lip straps not until about the seventh day. Soft diet may be prescribed from fifth to seventh day, and a return to regular diet thereafter.

The silver wire ligature is a precaution to hold tooth firm during manipulation of bur in process of excision, and for the support of weakened tooth during inflammatory condition of pericementum from operative traumatism, during a few days subsequent to operation. It is usually removed about the time lip strap is discarded.

The essential points of this method may be carried out in all

single-rooted cases, and such modification of it made as required for the excision of one or more roots of other teeth.

In presenting this subject the writer does not lay claim to anything new, except, perhaps, the technique as outlined and the name given to the operative procedure. Various methods more or less crude or unscientific, from a modern, surgical standpoint, have been advocated for the so-called amputation of tooth roots for many years.

While the present day heralds an advancement in dentistry through developments along the line of applied mechanics, it, unfortunately, has increased a tendency to confine our views to the restricted focus of a tooth, to the apparent disregard of other and equally important factors of health that demand our professional attention, hence the writer feels constrained, in closing to enter a plea for the greater consideration of that vast outer field of our professional jurisdiction, the oral tissues, their diseases, and the modern development of surgical procedures and methods of treatment affecting their cure.—*Items of Interest.*

HUMAN CHARACTER AND ANESTHETICS. By Dr. John T. Grant, Woodland, Cal. It is a significant fact that in the last twelve months, from the city of Detroit alone, the drug trade was supplied with so many milllons of pills that were they placed in a line, their surfaces touching, they would form a girdle of pills which would reach three times around the earth at the equator—each twelve months, for many years, showing a marked increase of output over the preceding year. This unthinkable procession of "rolling stock" which annually is switched down the "little red lane," is but an unimportant fraction of the pill output of the world's numberless pill-producing towns, and is entirely independent of the countless tons of powder preparations and streams of emulsions, tinctures and solutions which constantly keep the intricate mechanism of our home kin jumping sideways or into the air with the simple intent that he shall adapt himself to a condition of buoyancy or depression which the immediate occasion may demand—and to all appearances we are ignorant of, or indifferent to the fact that this process is surely a strong factor in the retrogressionary evolution of the genus homo into the genus hobo—which, after all, seems only a step.

This effusion is not planned to be an old wife's curtain lecture

against tobacco smoke, but rather to call attention to a fact which is so well known to us that we have forgotten it, namely, that a very large per cent of drugs are used for their anesthetic—anodyne —or similar—effect with only secondary regard for undesirable and permanent results, not to mention its correlative fact, that this practice is an important factor in determining the ethical stature of the race.

Possibly anesthetics and their sense-eliminating similars, together constitute the greatest good fortune which humanity has reaped from medical achievement, and it would be absurdest folly to comment adversely upon their necessary surgical and medical employment, but a matter worthy of serious consideration is the indiscriminate manner in which such drugs are dispensed, under patented disguise maybe, until among the laity and among such per cent of the profession as sports less than laity intellect, drug habit is the commonest degenerating influence in our civilization, for if persisted in it is destined to produce its corresponding convolutions in the brain and rises to the importance of an acquired characteristic of the individual, to be passed on to coming generations. As Spencer puts it, "If there is no inheritance of acquired characteristics, then there is no such thing as evolution," and our own Joseph Le Conte has said in no uncertain language that evolution is no longer looked upon as simply a working hypothesis, but is in reality an axiomatic fact. These two authoritative statements may be some indication of what we are coming to.

The grim humorist who said that in our treatment of the American Indian we had grafted him with all of our diseases that he might more fully appreciate our advance in medical achievement, might also have observed, that in so far as drug effects are concerned we have prosecuted the same spirit among our whites with increasing activity, until the genuinely normal human individual is the exception rather than the rule, being depressed or accelerated, "keyed down" or "teaed up" to fit the particular occasion. Without deference to the late (and early) lamented (and demented) Mrs. Nation, it is fair to remark that alcoholics used to approximate inebriety furnish a fitting example of this truth, but since, presumably, no one within hearing has ever experienced the "dark-brown mouth which tastes about like a Chinese family moving out" nor the breath which could be very much improved by the scent

of an old "bridge" just removed, this preachment is doubtless brought to the wrong audience save for your neighbors at home to whom you might wish to pass it on.

Habit doubtless makes the convolutions in the brain and the convolutions of this generation are to determine the stature of the next in both intellect and ethics. To us, as to "Johnnie's dinosaurus," the moral here is plain. If we go and eat a drug store it will give our children pain. If warned against too frequent association with the "hot bird and the cold bottle" we laugh it off in much the same spirit as the small boy who being warned against the fourth quarter of mince pie, replied, "Well, pass the pie and telephone for the doctor." And why not? Doctor is a good fellow. Sooner or later, should the appendix or other organ rebel, he will give us something so that we shall not feel it, and cut away the useless and impertinent appendage. True, we have learned to joke about the matter, but this may be due to a dulling of our perception—a consequent retrogressionary element in the evolution of the race—rather than to the development of a keen sense of humor.

Our poor, tired nerves drink themselves to forgetfulness by the painless method, leaving us to "wake on the garment-littered floor, the morning after the night before," with an amazing contraction of the hat band, and just budding to the realization of "what a h—l of a time we must have had last night," and then we immediately begin, "if we have the price," to sober up upon some brand of extra painless, which is really worse and more lasting in its effect than the brand which but a few hours before made the keyhole so inexplicably evasive.

Morphin, neurocain, absinthe, it matters not what, put our nerve sentinels to sleep and when they awake our whole nerve-army is prisoner under heavy guard in the camp of untold misery. From headache powders to hasheesh is but a step, but back again from hasheesh to headache powder becomes for many the journey impossible. Would it not be wiser to follow the first law of surgery, removing the cause of our ills, rather than the absurd temporarily painless method of putting the consequence to sleep?

The increasing prevalence of suicide may be traceable largely to the scarcity and feebleness of our race fortitude, which is becoming almost obliterated by the misguided painless spirit with which our ethical atmosphere is permeated, and genuine human

courage is becoming so rare that rather than suffer a pin-prick of mind or body many prefer the solution offered by touching the tongue to prussic acid. As man by retrogression approaches the abscess in his nature, like the abscess he follows the line of least resistance to the ultimate elimination of everything valuable in his character.

In the days when the Spartans neither asked nor gave quarter, nor chloroform, fortitude was as common as sunshine, but recent generations, by virtue (or by vice) of anesthetic protection from pain, have through disuse robbed fortitude of its hardihood until the brain convolutions which made fortitude possible have become well-nigh obliterated, and fortitude in its failing health has so infected enthusiasm of life that aggressive pessimism has become as common as tobacco smoke.

Pessimistic mental process is making impossible any high and adequate estimate of human life. Human life is the cheapest thing we have. The statement that more lives are sacrificed annually in the United States in railroad disasters than were lost on both sides in two years of recent Boer and British warfare does not hold our attention during the first course at luncheon, and this spirit is more prevalent among our highly enlightened pale-face kin than among some of the darker races. The Japanese from the dim past have looked askance upon all drugs which deaden sensation. Relevant to this fact, courage and fortitude in bearing pain are among the most prominent of Japanese characteristics. David Starr Jordan tells of a Japanese chosen from among several dozen volunteers to dynamite a Russian magazine (a feat which promised certain death), but by some inexplicable miracle he escaped a killing, returning with badly wrecked limbs and the fraction of an eye, and today, pensionless, is sweeping the streets of his native town for a living, his courage not even receiving honorable mention.

In another country, a handsome youth bred to the gentle art of killing, and attired for an occasion in appropriate bathing suit, fires with his own hand the long fuse to the bomb which is to sink a barge in the mouth of a bay and takes a pleasant plunge into a tropically tempered sea. The explosion is heard round the world and the hero not only enjoys the distinction of shaking the hand that struck Billy Patterson, but also kisses a goodly proportion of the fair sex of his native land. I mention this from no spirit of

jealousy, but to illustrate the point that we are coming to regard a normal act of courage as worthy of much gold and glory. Soon every tar who puffed a cigarette at that famous May-day picnic in Manila Bay, when a pitiable surviving fraction of the ancient Spanish armada made its final cruise to Davy Jones' locker, may be considered legitimate objects of government pension.

May it not be from a growing feebleness of spirit that we seek to shower with pneumatic glory the normal act of courage?

Can the special or general surgeon plead "not guilty" when accused of often cultivating this feebleness of spirit in his patients by the very methods which he employs?

Is it not often true that the patient, fortified with the knowledge that the operation will be painless, cultivates the habis of unsanitary slackness which make the operation necessary?

And as painless methods are perfected will not fortitude shrivel up and blow away, just as each of us who today carries a chronometer in his pocket, has lost the art of telling the time by the stars?

As the Lorelei ecstatic music and the display of mad'ning personal charms is reputed to have lured the unwary mariner to certain doom, may not the quieting drug, holding out the promise of painless exit from all our ills, plunge us into agonies we knew not of?

The anesthetic—the priceless booff—which we hail as the *physical savior* of the race, may yet produce a race whose *character* is proportionally less worth the saving.

Artificial necessity, today, demands that everything shall be painless and predigested. Even the school of experience and hard knocks which passes out the stuff which men are made of we would put into the hands of a receiver if we could, and looking upon education as a prepared nostrum sealed up in books and bottles, supply it to our unaspiring youth who, conspicious for his pipe and faultless trousers, sits on a cushion waiting to have poured into him the dope necessary for money getting. This painless process will never make a man of him and the only method which will make useful the blase youth with the ennui droop to the lid, is to blister his hands on the bucksaw route to learning.

Normal, helpful activity is the only source of genuine joy and these practical jokes which we are playing upon the nervous system

are "surely destroying its power to tell the truth." Pain drives and pleasure coaxes us toward the path of wisdom; both are incidental to sound action; if pain is in excess of joy it is because we have wandered from the path of normal activity, and it is insanest folly that as a remedy for pain we should put to sleep "the nervous system whose function is to carry from the environment to the brain the impressions of truth, that action may be true and safe."

But what is human character that it should give us such concern? "Live and learn, die and forget it all," is the commonest of platitudes, and like common platitudes may be a shot wide of the mark. What if every human life prove to be a soul in the making? What if it dawn upon us as the shadows fall that in reality we "are in eternal process of becoming" and that at least a short term in the school of adversity be necessary to our perfect development?

A PRAYER.

O keep naught from me that there is to see;
Let me know all there is to know.
And O, let me feel all there is to feel,
Full measure of woe with my portion of weal,
Till I grow all there is to grow.

O spare not the thorns when my roses bloom,
Cloud my blue with many a storm,
For I crave life straight from the hand of Fate.
Would you live the strong, you must suffer the great
Till the heart has grown kind and warm.

And O, let me drink to the very dregs
Ev'ry draught that is mine to drink.
Let no gall cup pass which a mortal has,
If 'tis mine, I take it without an "alas,"
While the spirit disdains to shrink.

Ere the heart can love all the heart can hold,
It must ache all the heart can ache.
No cow'rd's sleeping draught would I choose to quaff,
But on to the grave with a shout and a laugh,
While the spirit is wide awake.

Content would I be in the face of death,
With a peaceful, calm, confident grace,
For should Death's arms bless me with nothing less
Than the ecstasy born of a soul caress,
I would joy in my biding place.

And though I would live all there is to live,
Let me die all there is to die,
For I see the immortal through "dust unto dust,"
And I bare my breast to the bayonet thrust
With never a wince nor a cry.

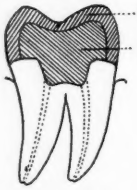
So while I would laugh all there is to laugh
Let me weep all there is to weep.
Let me take my chance with the vanguard, advance
Without a regret nor a backward glance,
Though I sleep all there is to sleep.

—*Pacific Dental Gazette.*

SOME EVERYDAY APPLICATIONS OF CASTING UNDER PRESSURE. By Dr. O. Solbrig, Paris, France. At our last meeting I had the honor of presenting some of the results of

FIG. 1.

FIG. 2.



experiments carried on since September last, beginning with inlays and crowns, passing on to bridges, partial plates and even full dentures. I gave a general outline of my method of preparing, investing and casting this work, and also a description and demonstration of the apparatus which I use.

Having already had the opportunity of giving a minute description of this method as applied to ordinary gold inlays at a previous meeting,* I propose to speak tonight more particularly about large

*See DENTAL DIGEST, April, 1908, pp. 448-462, with illustrations.

inlays, hollow inlays, mixed inlays, the various forms of hollow metal crowns, crowns in connection with porcelain, bridges and plates.

Let us take into consideration the extreme limit of an inlay where the whole occlusal surface and the main part of the crown

FIG. 3.

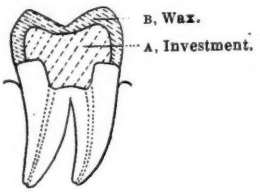
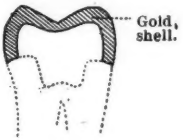


FIG. 4.



have to be restored (Fig. 1), in other words, an inlay crown or a cast top.

There are two methods open to us:

I. We can make the anchorage in the pulp-chamber, when—(1) The solid inlay is, of course, indicated. The excessive cost of a solid gold inlay may be avoided by the substitution of a cheaper alloy. (2) If it be desirable to retain the appearance of gold a mixed inlay will sometimes help us out of the difficulty (Fig. 2) as follows: After taking a perfect impression of the

FIG. 5.

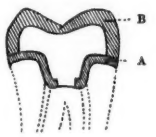
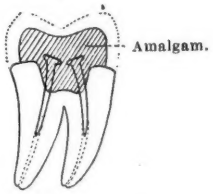


FIG. 6.



tooth, make a model in cement, Spence's metal or amalgam. Having cast the articulation, build up in investment to the shape of A (Fig. 3), then model the tooth with its exact contact points, shape and occlusion (represented by B), remove the investment and wax from the model and cast in the usual way, which gives you a hollow shell in gold (Fig. 4). Now fill the inner part with wax and cast a second time, either with tin or silver or other alloy. (3) We may employ a hollow inlay, which is best accom-

plished for the case in question in two castings. After casting a thin lining of the cavity of the tooth (Fig. 5, A) attach to it the outer shell B, already described, by a second casting. The two metals will unite perfectly if the investment is sufficiently heated.

FIG. 7

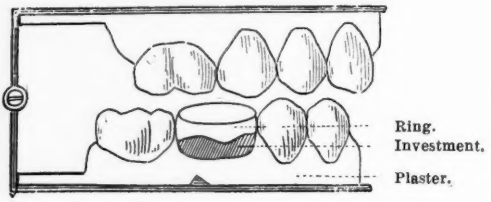
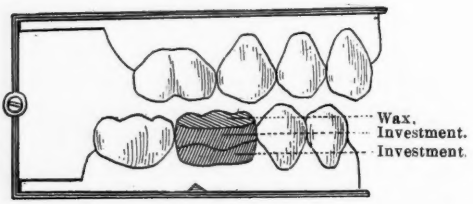
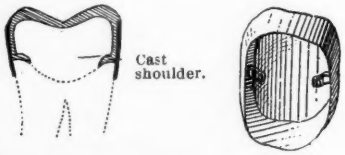


FIG. 8.



II. It is sometimes preferable to build up the tooth in amalgam, cementing two pivots in the roots and giving the tooth the shape represented in Fig. 6. The wax is then easily molded to the desired form and the cast made in the usual manner.

FIG. 9.



An inlay of this kind has considerable advantages over an ordinary shell crown. The preparation is certainly less annoying to the patient, as the bulk of the tooth is preserved. The tooth is not weakened by the grinding necessary in cutting its sides parallel. We also avoid any injury to the gum which might be

caused by the wheel or in the fitting of the band. The finished inlay will have a more accurate anatomic form, better occlusal surface with sharper cusps, and it will never be too high, as so often happens with a swaged-top crown. The projecting band, which may irritate the gum, is replaced by edges absolutely flush

FIG. 10. FIG. 11

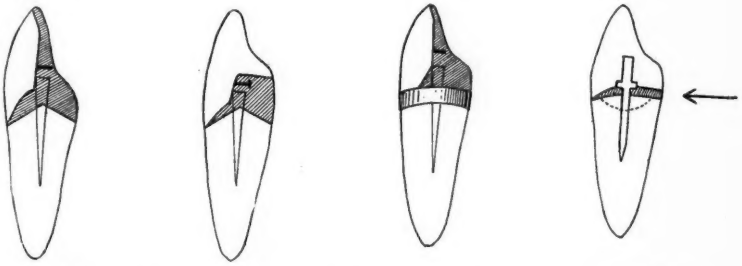
FIG. 12.

with the tooth and, therefore, readily kept clean, and subsequent decay may easily be detected at any time.

Many cases, where formerly we were obliged to choose between a shell crown or an amalgam filling, we now may treat with permanent results and satisfaction to the patient and operator by means of one of these cast tops.

There are, however, cases in which the hollow metal crown is

FIG. 13. FIG. 14. FIG. 15. FIG. 16.



essential, and here again we find certain advantages in casting it. After fitting the band take an impression in the usual manner, fill the ring with investment material and after allowing it to set cast the model and articulation in plaster (Fig. 7). The missing portion of the tooth is also restored in investment, care being taken to leave sufficient space for a layer of wax representing the biting surface (Fig. 8). The band, filled with the two layers

of investment, and the wax, are now easily removed from the model and the whole is invested and cast in 22-k. gold. If the cylinder be hot enough, the ring and the biting surface will weld together perfectly. After polishing we shall have a crown with perfect occlusion and sharp cusps, and its color will be uniform, since no solder has been used.

When we have to restore the crown (Fig. 9) of a tooth ex-

FIG. 17. FIG. 18. FIG. 19. FIG. 20.

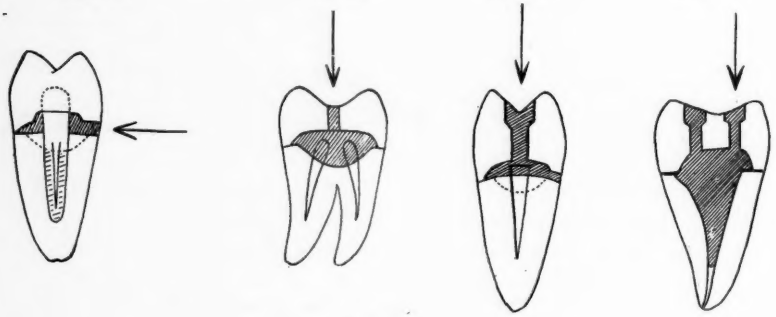
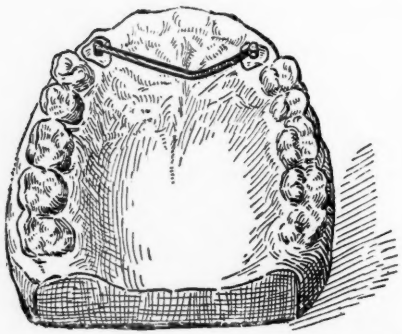


FIG. 21.



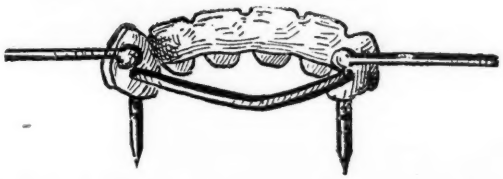
tremely decayed below the gum, it will be of great advantage to have a little shoulder to assure the perfect seat of such a crown and prevent its pushing up in the gum at the moment of setting. This shoulder can easily be cast after previous modeling in wax at the same time as the biting surface.

Unusually large contact points, ears, etc., can be obtained in the same manner. (Figs. 10 and 11.)

In a case where a tooth is separated by a considerable space from its neighbor an extension crown (Fig. 12) is more easily constructed in this manner than has ever been possible before.

Window crowns will be more lasting if their fit is absolutely perfect and casting will contribute materially to this end.

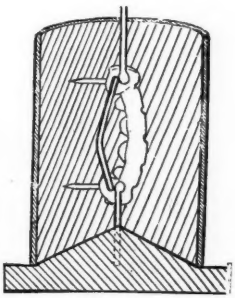
FIG. 22.



The advantages of casting in connection with porcelain are still more apparent. For the construction of a pivot tooth we shall adjust a porcelain facing without any backing and unite it to the pivot by means of hard wax, carefully shaping it to the root and testing the articulation. We are ready now to invest and to cast. Pivot and pins will unite perfectly and the crown will have the

FIG. 23.

FIG. 24.



desired shape, unnecessary filing and trimming being avoided, as is also the danger that the borax may crack the porcelain, no flux being necessary (Fig. 13). A tooth for vulcanite work may be used with equal facility (Fig. 14).

If we wish to make a Richmond crown we may cast the back without risk of burning the ring and with the certainty of welding

FIG. 25.

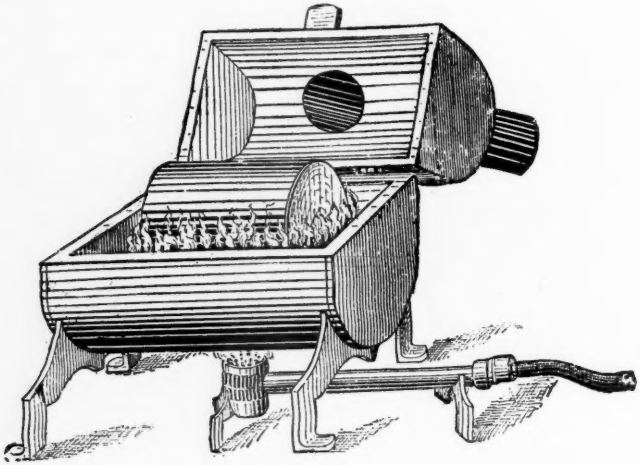
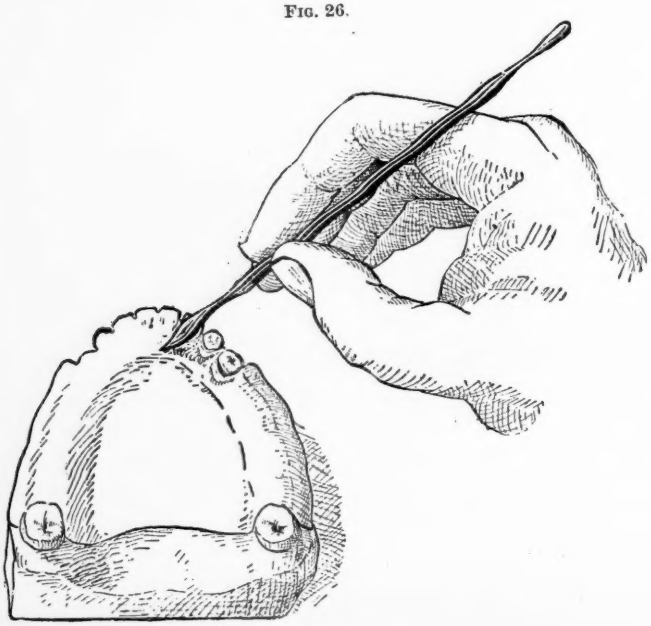


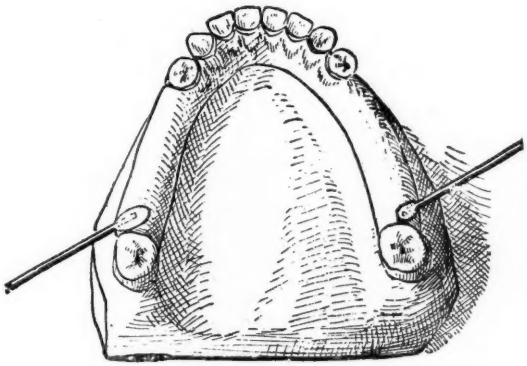
FIG. 26.



ring, pivot and tooth together in one casting. The pins need not be bent or roughened (Fig. 15).

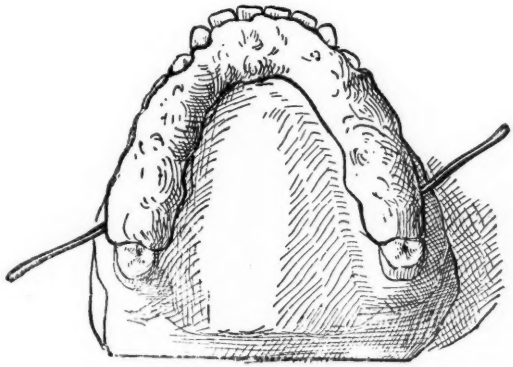
All porcelain crowns with removable pivots, such as the White,

FIG. 27.



Justi, Davis, etc. (Fig. 16), and also Logan crowns (Fig. 17), may be employed with the certainty of a perfect adjustment to the root. The porcelain is fitted only to the external border of the

FIG. 28.

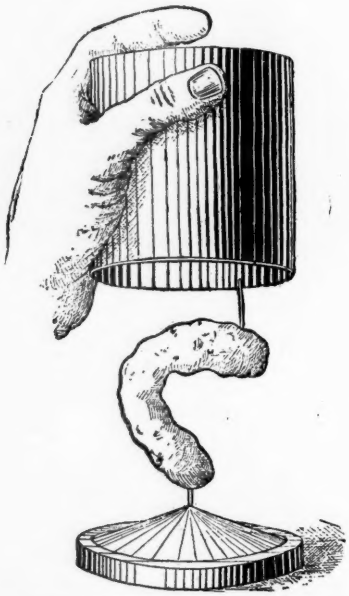


root in order to conceal the gold. Crown and pivot are then united by wax, which takes the perfect form of the root, and the whole is cast from the inside, taking advantage of the space left between the porcelain and the root on the lingual aspect. The

wax will also take the shape of the upper portion of the root-canal and strengthen the pivot at that point. The fit will be more perfect than could possibly be attained either by grinding the porcelain or by swaging a piece of gold to the root.

Pierced porcelain crowns, such as the Ash crown (Fig. 18), Mountfort crown (Fig. 19), or Bonwill crown (Fig. 20), are still more convenient for this kind of work, as they allow of

FIG. 29.



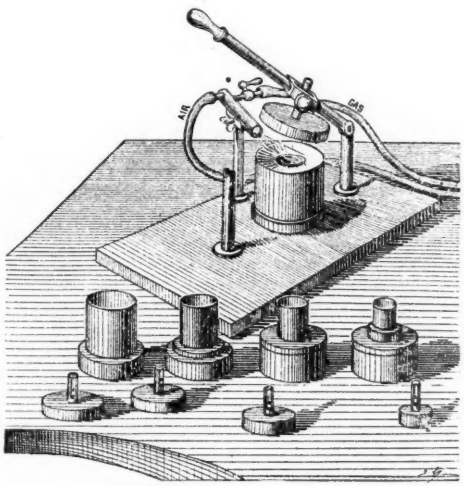
casting through the crown, thus reducing to a minimum the thickness of gold covering the root. The new procedure is of great assistance if we wish to reproduce the form of the root-canal (Fig. 20). Silver might be used in such a case.

Bridges with or without teeth are constructed in the same manner. The bands are fitted in the mouth and the rest is shaped in wax on the model, after which the whole is invested and cast. It is advantageous, however, to first unite the posts by a stiff wire in order to prevent any change in their relative position (Fig. 21). The wire may be laid outside the body of the bridge

so as not to interfere with the perfect shape of the wax (Fig. 22).

We must prepare the wax as carefully as possible, for every smallest detail will be faithfully reproduced in the cast. We have to take special precautions to keep the anterior surface of the porcelain absolutely free from wax, since any gold covering it will check the tooth at that point. It is also advisable to leave a minute space between each facing, and if we are careful to heat

FIG. 30.



our investment sufficiently before casting we shall never have any broken porcelain.

As in the case of crowns, we take the precaution of first covering the work with a thin layer of investment to avoid air bubbles (Fig. 23), and before allowing it to harden we mix some fresh investment with which we fill up the cylinder (Fig. 24). After its complete investment we place it in a special stove (Fig. 25) long enough to dry it thoroughly, to burn out any trace of wax and to heat it until the mass of investment shows red through the inlet. In casting I use 18-k. gold for bridges and 20-k. for crowns on account of its superior rigidity.

As an example of casting plates, let us take the construction of

a partial lower plate. After moistening or oiling the model, apply as accurately as possible a sheet of a specially prepared wax of the desired thickness, letting it touch at all points. Cotton soaked in warm water as Dr. Burt recommended will apply the greater bulk, but oiled burnishers will be useful to finish the finer corners (Fig. 26), taking pains to avoid the slightest perforation in the wax plate and making the surface as smooth as possible. With a little hard wax we now attach our sprue-wire to one end of the plate and a second wire to the other end (Fig. 27). This second wire after its removal from the investment will serve to make the vent hole which is advisable in all extensive cases. To allow of the removal of this thin plate of wax from the model without change of shape, we strengthen it with a layer of investment material applied over it and allowed to harden (Fig. 28). Having removed the thus stiffened wax plate, apply to its under surface a similar coating of freshly prepared investment and before allowing this layer to harden invest the whole in the cylinder (Fig. 29). After the investment has hardened, the cone and the two wires are removed and we can make our cast, after carefully drying and heating as I have before described in the case of bridges.

The press which I use is represented in Fig. 30 with five different cylinders, easily interchangeable and suitable for all cases.—*Dental Cosmos.*

PORCELAIN SPLINTS IN PYORRHEA ALVEOLARIS. By H. E. Belden, M.D., D.D.S., New Orleans, La. Patients often apply to us with the lower centrals very loose; in fact, sometimes they are so loose that we wonder why they do not fall out. These patients are very loath to have these loose teeth extracted, and I have fastened many by gold bands, but this is quite a troublesome operation, and it is not a satisfactory way, as the bands work loose and look unsightly.

I have tried cutting grooves in the lingual surface and uniting them by cast fillings, but it requires a great deal of fine manipulation and dexterity to make a substantial job that does not show the gold, for there is very little material in lower front teeth into which one may cut sufficiently deep to make cast fillings with strength to stand the stress these teeth have to stand, and if the

latter are tipped with gold you might as well put on gold caps, for all you see of the lower teeth is the tips.

I have an original way of dealing with these cases. I make for them porcelain supports or splints, which work like a charm. I must say that I undertook the first case with fear and trepidation, but I realized that we have to hold a member immovable to have it heal, and also that devitalizing the tooth adds to its

FIG. 1.

FIG. 2.

usefulness and makes it firmer in the gums—"united they stand, divided they fall."

In order to make the splint the loosened teeth are first ground down upon their incisal edges about 3-32 of an inch, the pulp chambers are opened, the pulps removed, the apices are closed and the canals enlarged sufficiently to take a platinum pin sufficiently heavy for the purpose. The appearance of the shortened and prepared teeth is shown in Fig. 1.

For the treament of such a condition as is represented in Fig. 1

FIG. 3.

FIG. 4.

the three pins necessary for holding the teeth rigidly together are formed of two separate wires, the end posts being of one wire formed like a staple and the middle one being a separate pin; they are now soldered together, as shown in Fig. 2.

Thin platinum foil in one sheet is pressed and burnished over the incisal ends of the prepared teeth and the platinum pins are forced through the burnished foil as it is held in place on the teeth. When foil and pins are in correct adjustment their free surfaces are covered with S. S. White bridgework wax and a model of plaster is made in which the pins are imbedded, after which S. S. White porcelain is built up to reproduce the teeth,

which is then baked in a Hammond furnace. After the splint has been baked the platinum foil is removed and the splint is ready for insertion.

The splint with the separated platinum foil foundation is shown in Fig. 3. The finished splint as adjusted to the prepared teeth is shown in Fig. 4.

When you have finished and set the porcelain splint with cement, you have improved the appearance of the patient with no more effort than you would have expended in banding teeth, and I think one is justified by the circumstances in grinding them down. When I have molars to deal with my *modus operandi* is to grind a suitable cavity, if none already exists, in the crowns of the adjoining teeth deep enough to hold a cast-gold filling. I devitalize the pulp of the loose tooth and cut off a good portion of the crown and place a pin in the root; then make a cast filling—which includes the support and restores the crown of the loose tooth—which, when cemented fast, binds all together. Some of this work has been doing good service for more than two years and is to-day apparently as good as when inserted.

This way of mechanically treating loose teeth may satisfy the patient, but as healers of the dental ailments of suffering humanity it is not proper that we should be content with merely meeting the demands by mechanically preventing the dental organs from shaking and wabbling in their sockets.

We gain our knowledge from scientific research and then prove it by clinical experience; we do not know what results we will obtain by the combination of different substances until we have actually combined them; we combine them and then we make a note; we know by a classification and proper selection that the same group of conditions with the same treatment will give a certain reaction.

It behooves us, as a body of scientific researchers, to investigate the cause and effect of this disease and find out why teeth so affected shake and wabble. I must acknowledge that I do not know and I have failed to find, in looking over everything that I could find written on this subject, anything that was conclusive.

Cooperative Research. — Now, as pyorrhea alveolaris is one of the knottiest problems we are called upon to solve, why not have a committee appointed to investigate and report at our

next meeting? The matter could be brought to the attention of all the associations of the United States and be taken up by each member. Lists of questions could be printed and sent to every dentist. We need the help of the entire dental and medical professions; we want the co-operation of the whole scientific world, if necessary, to stamp out this seemingly incurable affection.

Much has been written and much has been said, but really very little of practical importance has been brought out since Dr. Riggs called the attention of the profession to this most important subject more than forty years ago. Unfortunately for us, he has left very little written matter, as his work was chiefly clinical. What we want to know is what causes the disease, what will prevent it and how to cure it? This can only be arrived at by associate investigations; individual efforts fall short, for by the time the dentist recognizes the disease the demon has left his footprints on the gums; we want to annihilate him before he has had an opportunity to leave his imprint there. What we further need is a more clear-cut line of demarkation in diagnosing loose teeth, for we do not want to group together all loose teeth under one name, as this is misleading. Let us have all the different diseases of the gum tissue classified.

There seems to be a vast difference of opinion among the profession; they lose themselves in a labyrinth of uncertainty, wind up in breathless excitement and give some high-sounding scientific name that knocks the breath out of the students who try to pronounce it.

At present we have about a dozen names aimed to express one condition of loose teeth: Pyorrhea alveolaris; suppurative gingivitis; Riggs' disease; Fauchard's disease; phagedenic pericementitis; alveolitis calcicosis; calcic inflammation; interstitial gingivitis; paradental dystrophy—atrophy.

There may be other names, but these are all that I can recall, and they are sufficient to illustrate the confused state of our knowledge on this question.

Consider what has been done by the government in the line of investigation. We need go no farther than the demonstration of the cause of yellow fever by the establishing of the mosquito theory. The government has not appointed a commission to in-

vestigate the cause and cure of pyorrhea alveolaris and I don't know that it will; the nearest it has come to the subject is the work that has been done by the Pure Food Commission and the good accomplished in that direction cannot be overestimated.

"Curing" Pyorrhea.—Have we had the same success in the investigation of the causes and the treatment of pyorrhea alveolaris as we have had in the treatment of necrosis, or as we have had in the stopping of dental caries by the filling of teeth? Have we had the same success as we have had in orthodontia, or prosthetics, or in prophylaxis? In answer to this I will quote Dr. Talbot: "I questioned a pyorrhea alveolaris specialist of national reputation quite a good deal in regard to the habits of his patients after he had cured the gums as he claimed to do. I found that every patient had to come back as often sometimes as every two months, sometimes four times a year, and sometimes twice a year, to have their gums treated again." This answers our question; they were benefited, but not cured.

When we hear of curing pyorrhea you may rest assured that the diagnosis is one of tartar under the margin of the gums. In 90 per cent of so-called cured cases nothing more has been accomplished than the removal of the accumulation of tartar. I cure tartar under the gums, we all do, but I would like to ask those who contend that all pyorrhea alveolaris is caused by tartar, what has tartar to do with the first stages of pyorrhea? In that condition you find no tartar; it is not until the secondary stage that it is thrown out, by nature, in order to fasten the loosened teeth. This is the condition where we meet our Waterloo!

This is no new disease peculiar to the present time. We cannot lay it to the stringency of the money market or the evils of race-track gambling; we find it as far back as we can go, for we know that the very oldest inhabitants of the globe suffered from it. When Rameses II was exhumed, on examining his mouth it was found that he had suffered from pyorrhea alveolaris and that he had received treatment by the dentists of his day. Several of his teeth were held in place by gold clasps—dental splints—and he had bridge work, undoubtedly to replace the ravages accomplished by pyorrhea alveolaris.

And this disease must have existed with the ancient Greeks,

for they mention gold splints in their sonnets and epigrams, and even in the laws of the Twelve Tables they mention teeth fastened with gold. Before them the Etruscans, who excelled in gold work, introduced the art of gold-fastened teeth into Rome, and undoubtedly if we could get hold of some of their pyorrhea alveolaris splints they would prove very interesting. We call "Etruscan gold" after them.

Etiology and Treatment.—As far back as 1757 Bourdet pointed out that there were two causes for pyorrhea alveolaris—systemic and local; that systemically, through stagnation of the blood and acid lymph, the alveolus was dissolved by a consumptive process and locally by tartar irritation. He fell into the same error that many do at the present time of embracing several diseases under one designation. He cites the exposure of the roots in first dentition, an exposure which is really due to the erosive effects of suppurative stomatitis or neglected alveolar abscess.

Pyorrhea alveolaris is a disease of the alveolus and not of the gums. The gums, acting as a covering to the alveoli, serve as an envelope to hold the pus and products of disintegration of the alveoli, and as the pus and gum phenomena are very apparent, the gum gets the credit of the disease when in reality it is only a manifestation of the cause, the result, the effect and not the disease. In examining the dental literature on this subject I find that most writers say very little about the disease; they eschew the etiology and pathology, as I have done. This is quite natural, for when we do not know the cause what is the use of theorizing? Is it not much better for us to talk of something that we know than to evaporate in ethereal space on the possibilities of the unknown? It is like groping in the dark to keep on with clinical observations unless guided along lines of proved scientific research.

At present there is but one string persistently twanged; it is to scrape the teeth and treat the gums with astringent washes. It is the same method that Riggs taught and it seems impossible for the dentist to get beyond it.

The instruments exhibited to you on this tray are of the same pattern as those used by Dr. Riggs; they were given to me by Dr. Evelyn Crofoot of Hartford, Conn., who was a personal friend of Dr. Riggs. *This* tray, however, is of later pattern. You can

readily see how much more delicate the points are, in noticing these of the present day, how very delicate and appropriate they are to perform the work; they are designed to reach way up under the gums, so as to remove the serumal calculus without lacerating much gum tissue.

It seems quite a fad in the profession for each specialist to have a number of his own specially designed instruments. It seems to me if suitably shaped instruments were used and the operator's skill educated to their effective use, that it would be better than such a vast number of different shaped points. The profession has surely exercised its inventiveness in devising different instruments; those here exhibited are not one-eighth of the patterns made for the treatment of pyorrhea alveolaris. I could not show you the complete line, nor do I think that anything could be gained by it if I did so.

I have also prepared a list of all the remedies mentioned by the writers of the different articles that I have read. It is not given as a complete list, and, perhaps, you may be familiar with them all, but as I do not claim any originality in this paper, I give them for what they are worth.

Washes. Astringent. Antiseptic.

Mechanical agents. Pulp-devitalization. Instrumentation. Compressed air. Scaling. Removing of tartar.

Electrical agents. Galvanic current. X-ray. Electrical massage. Violet ray.

Medicinal agents. Trichloracetic acid, 25 to 50 per cent; aromatic sulphuric acid, 25 per cent; phenol sodique, 25 per cent; zinc chlorid, 50 per cent; pyrozone, iodoform, codein, sulphuric acid, lactic acid, tannic acid, copper sulphate, zinc sulphocarbolate, zinc nitrate, quinin, saline solution, milk of magnesia, lac bismo, phenol-sulphonic acid, adrenalin, kali chloricum, Carlsbad salts, phenol-camphor, calcium lactophosphate, potassium sulphocyanate, uric acid solvents and antisyphilitic remedies.

Modern Opinions on the Nature and Treatment of Pyorrhea.—I have prepared a short *resume* from some of the recent articles I have read giving the opinion of certain of our present-day dentists. Their diverse opinions will go to show how far from being settled the cause of pyorrhea alveolaris is. However, one point they all agree upon is that too much stress cannot

be put on the necessity for the most thorough prophylaxis. This is what Dr. Taylor says: "I had the honor of being a student of Dr. Riggs for six years. I agree with his theory that it is purely a mechanical irritant. There are only three methods of curing this disease: (1) Extracting the teeth; (2) the radical and thorough removal of all deposits and (3) by removing the greater portion of the deposit and stimulating the tissues so that the remaining deposit will be thrown off and new tissue stimulated."

Dr. Talbot opposes the theory of Dr. Reeves, which was revived and amplified by Dr. Pierce of Philadelphia, that pyorrhea alveolaris is due to uric acid or gout; he has made a special study of it, and says it is the result of self-poisoning and that the blood pressure, the diet and general health of the patient should be looked to. His name for the disease, "interstitial gingivitis," due to autointoxication, is familiar to us all.

Dr. Black says it has its seat in the glands of the pericemental membrane and is due to some microorganism not yet identified. Dr. Younger and others tried hard to fasten the trouble on a special bacillus, but as yet there has been no special microorganism discovered peculiar to this disease. If the germ could be discovered the administration of antitoxin would, of course, be the proper treatment.

Dr. Carl D. Lucas points out, in a scientifically fine-spun article on the formation of calcic deposits on the cementum of a tooth, that by the high percentage of uric acid the sodium biurate is precipitated, which produces chronic hematogenic calcic pericementitis—this being a chronic inflammation which extends to the alveolus—and pus pockets are formed.

F. H. Sibley says it is largely due to arteriosclerosis, which comes in old age, when the cell life is ended, having run its cycle. Everybody has a cycle to run, a life to live, a fact which is true of muscle, nerve and bone; it is true of cell life, but we have cases of pyorrhea alveolaris in young life, where the patients are far from senile decay.

Dr. Lenox Curtis points out that syphilis is a frequent cause, and to substantiate this statement says that it yields to antisyphilistic treatment.

Dr. Clemmons, by misroscopic investigation, proved that the

cementum of pyorrheal teeth is denser than that of sound teeth. So, nature not being able to add any more inorganic matter to the tooth substance, it is poured out in the alveoli and produces inflammation, breaking down the tissue. So, when the tooth is devitalized, this building up of the tooth is stopped and the disease arrested.

Dr. Otto Juettner and G. S. Junkerman, with others, have called our attention to the opsonic question in the etiology of the disease and if we hope to make a cure the opsonic index has to be raised in order to aid the phagocytes to destroy the pathogenic germs and to bring about a condition of immunity.

This might be done by vaccination if a vaccine serum could be made from a product of the disease itself and injected so as to raise the opsonic index.

Dr. T. H. Allen recommends the use of lymphatic stimulation in its most approved methods, by both patient and operator, with the use of rubber cot, brush, towel or finger, and also the mechanical vibratory appliance. It seems that he looks for relief in osteopathy.

Dr. T. G. Worthington considers this condition is caused by local irritants, so the obvious and principal step in the treatment is their complete removal.

Dr. W. H. Whitslar has called our attention to the use of an entirely new remedy—zinc sulphocarbolate.

Dr. T. V. Boswell believes that there are conditions existing, local and constitutional, which must be considered together. No matter what the cause may be, the practical treatment must be local. A mouth kept clean from childhood would not be subject to the disease.

Dr. Endleman says there are two distinct forms, the systemic form differing to a considerable extent from that of the simpler local form, in which the disturbance begins at the neck of the tooth, and by continuity causes the gradual destruction of the pericemental membrane and the exfoliation of the tooth. In the systemic form the predisposing cause is very frequently a malocclusion so small as to defy detection.

Dr. A. H. Ketchem says: "It is too much to hope that we will discover the cause of the deposits upon the roots of the teeth and the necrosis of the pericementum," but we would not

be surprised if it is not eventually found out that faulty assimilation of food and faulty elimination of the waste products have a great deal to do with the cause. Pyorrhea is one of the pathologic causes of malocclusion.

Dr. D. D. Smith claims to cure pyorrhea alveolaris by a systematic prophylaxis; he says it is not properly classified as a disease, but should be placed among the inflammations. It is a purely local affection and wholly due to the irritation from stagnant matter adherent to the surfaces, necks and roots of natural teeth, and that if not the entire, it is the prime cause of renal disturbances, uremia, diabetes, albuminuria and also many other constitutional diseases—that Bright's disease is caused by Riggs' disease, and not Riggs' disease by Bright's disease.

Dr. Albert Senn of Zurich says: "The longer I consider, the more convinced I am that pyorrhea alveolaris is a local disease, the appearance of which is favored by a body weakened by disease or by an irrational manner of living. There are complicated, severe, incurable cases in which we can frequently find neither purulent tartar nor articulatory disturbances." He calls attention to a peculiar fetor or odor and contends that it does occur in childhood, especially in deciduous teeth, but that it is not inherited, though a predisposition to it may be transmitted.

We know that the gums, alveoli and teeth derive their nourishment from the blood supply and that the teeth are held in place by bone, assisted by gum tissue; when these tissues are lost we have to restore them.

Dr. Harlan has succeeded in bringing back gum on denuded necks of teeth. Pure silver wire wrapped around the roots of a molar will keep up a constant irritation and will dissolve in about three or four weeks; it is about as good a bacterial destroyer as any germicidal agents. But as to building up the bone tissue, although we may expect to meet with success in other parts of the body, I have my grave doubts of ever restoring pathologically lost alveolar tissue. Where it has been lost from traumatism, as in regulating, it is possible, but, as it is a transitory structure as well as an end-organ, when such loss is caused by disease I have, as I said before, my grave doubts.

But, be this as it may, the committee I have suggested can settle all this for us. If they can suggest a cure for this disease condi-

tion, a way by which we can reproduce the alveoli or make new bone grow, or produce some fibrous bony filaments that will serve to support the loosened teeth, they will immortalize their names, and their busts in bronze or marble may adorn the Hall of Fame—*Dental Cosmos.*

CARE OF CHILDREN'S TEETH. By Dr. S. G. Walton, Cincinnati, Ohio. The first essential, it seems to me, in the care of children's teeth is to know how to handle the child, so that we may be able to render it the best service. Without the confidence of the little one, how can we expect to do effective work? The question then is, how are we to gain that confidence and make the child feel that we are its friends and benefactors, rather than individuals to be feared? Personally I believe we can secure the child's warmest friendship if we but take the time to amuse and play with it for a little while, allowing it to examine the mirror and instruments, giving it a ride up and down in the chair, or such other amusements as we think will appeal to it. The time seemingly lost at this first acquaintance of the little child is more than compensated for at the subsequent visits, by its allowing us to proceed with the work uninterruptedly. My experience has taught me that a child's first impressions are very lasting, and if we inspire the feeling of fear it will sink so deeply into the child's mind that we will be unable to eradicate the feeling. It sometimes surprises me to find how much pain a child will endure when it knows you are going to repair the affected tooth so it can eat candy and such other things that children crave, without suffering, as it has before.

Lancing for Erupting Teeth.—As we are sometimes called upon to assist in the eruption of temporary teeth, it is important that we be able to diagnose the case when the child is presented for examination and treatment. In case the outline of the tooth is seen beneath a swollen and tense gum, a simple incision with a sharp sterile lance in the anterior region, or, as is more often demanded, a crucial incision over a molar, will relieve the little sufferer, and result in the cessation of all symptoms of convulsions. Mothers sometimes rub the child's gum with a thimble, thus assisting dentition. Dr. Otto Inglis tells of a case where the parents exhibited more rational thought than the physician in at-

tendance. They were anxious to have the baby's gum lanced, but the doctor was afraid of cicatricial tissue forming over the wound, and the child died in convulsions. At this age, as the root is not complete, the edge is open, forming intimate relation with pulp tissue, and if pressure is brought to bear by resisting gum, the irritation may give rise to relatively the same degree of stimulus received in case of large exposure of pulp in an adult affected with caries.

The question arises, how soon should a child's teeth be cared for? Dr. Henry Bohn says, "As soon as children have teeth." The mother can begin the necessary care by cleansing the child's teeth with a cloth until it is old enough to imitate her with a soft brush and mild antiseptic mouth wash. After a child is two and a half or three years of age, its teeth should be examined by the family dentist at least twice a year, or oftener if necessary.

Temporary Teeth.—When we find cavities in the children's teeth, the question with us is, how shall they be treated, and what material used in filling them so that they will give the best service, performing their function properly? One says, never under any circumstances should a deciduous tooth be devitalized. Another says, devitalized and remove contents from pulp chamber and fill that portion with good antiseptic paste (he uses a mixture of zinc oxide, iodoform and oil of cloves). Abscessed deciduous teeth require most attention, and where it is advisable to fill the roots, they should be sterilized preferably with equal parts of cresol and formalin, and filled with a material which is absorbed with the roots, for any other material offers a source if irritation for recurrence of the pathologic condition.

We find it is almost impossible to dry the root canals thoroughly, so it becomes necessary to use a material that will adhere to moist surfaces. Dr. Henry C. Ferris, of Brooklyn, suggests a filling material which he finds meets the requirements for a good root canal filling material in temporary teeth. The formula he uses is:

℞ Isinglass .....℥j.
Tannic acid .....gr. jss.
Cresol .....m. iv.
Distilled water .....℥ jss.

Mix and heat in a water bath to 100° F., when it becomes

syrupy and can be introduced into roots and covered with cement or guttapercha

Copper Amalgam.—It is conceded by most of the profession who pay especial attention to children's teeth, that copper amalgam is the best all round filling material we have today for the temporary teeth. It is non-irritating and does not wear away the cement or guttapercha, and possesses better preservative qualities against recurrence of caries. Some strongly favor the use of copper oxyphosphate cement, on account of its being non-conductor and antiseptic, and because it will adhere to damp walls.

The fact that temporary teeth are of less solid and firm texture than permanent ones should not be ignored, for the reason that decay proceeds more rapidly and consequently they should receive diligent attention.

We are often asked the question: "Why is it necessary to pay so much attention to temporary teeth when they are so soon lost?" This question requires an intelligent answer from the dentist, who is trying faithfully to perform his duty with the child's future health and happiness as his only incentive.

I think one of the most important reasons for properly preserving the temporary teeth, until they have done their duty, is to prevent malocclusion, which not only affects the ability to masticate and to enunciate correctly, but affects the comeliness of the face through life. Deciduous teeth assist in a mechanical way in developing the alveolar process and jaws proper, so should be retained until the permanent ones are ready to come through the gum. Under this head I think it would be well to consider the other causes of malocclusion as well. The first cause, as mentioned, is permanent loss of deciduous teeth. Second: Prolonged retention of deciduous teeth and roots. Third: Loss of permanent teeth, including first molars, by extraction. Fourth: Tardy eruption of permanent teeth. Fifth: Non-eruption of permanent teeth.

Any obstruction caused by retained temporary teeth or their roots will easily direct the permanent tooth into a wrong position, and as the bone of the alveolar process is built up round the neck of the erupting tooth, in whatever situation it may assume, the

completion of the root will perpetuate the irregularity, unless an opportunity is afforded for rectification. Dr. Ames advises the extraction of the single-rooted teeth on account of diverted roots, but grinds off crowns of deciduous molars so that the roots remain intact until forced out. As we know, the first permanent molar erupting between the maxillary tuberosity in the upper jaw and ascending ramus in the mandible, thus holds an important position, for it serves as a grinding surface while the incisors are developing and prevents their wearing away by attrition, which would otherwise result. As this is an important time in the body building period of life, intelligent watching is necessary to prevent permanent teeth being mistaken for temporary ones, by those who are unable to recognize the individual anatomic peculiarities.

The cuspid crypt is more deeply placed than the lateral and first bicuspid, so that the premature loss of the temporary cuspid allows the permanent tooth on either side to approach the other, with the result that the aftercoming permanent cuspid assumes a position outside the dental arch. The divine plan for the eruption of temporary teeth at intervals in different portions of the mouth is a wise one, for, if the posterior teeth erupted at the same time as the anterior ones, the jaw is so formed at six months that the back teeth alone would occlude, leaving an open bite in front. In like manner they are replaced by the permanent ones, if proper attention has been paid the temporary teeth, in a way calculated to do the most efficient service.

We find a very plausible reason for properly caring for the temporary teeth in the fact that many permanent teeth decay, due to caries being present in their predecessors, but of course the thing of most vital importance for us to consider in this relation is the proper care of them, to promote the general health and growth of the child.

Care of Teeth by Parents.—Parents should be educated to care for the child's teeth just as carefully as they are taught, by custom, to care for the surface of its body. As the mouth is the gateway to the stomach, this portal should receive the most careful attention to guard against hopeless disease, which is the ultimate result from carrying the germs continually into the system. They should be taught to instill into the child's mind the fact that unless the food is thoroughly masticated and saturated with saliva it is

slowly digested and the stomach is called upon to bear a heavier burden than nature intends it should. Mothers do not know that they are doing their babies a positive injury oftentimes by allowing them to be artificially fed by means of the rubber nipple, or indulging them in the use of the "dummy" or "baby comforter." These appliances cause a gap between the upper and lower incisors, consequently depriving these teeth of their usefulness.

Diet.—The subject of diet in relation to the teeth is an interesting one. Among the semi-barbarous or primitive tribes undeveloped jaws and teeth are the exception. Caries is infrequent and nearly normal occlusion is the rule. Their diet is of such a nature as to require vigorous chewing, while the masticatory apparatus of civilized man is simply suffering from disuse. The lack of development of the jaws, particularly in America, is observed almost as frequently in very young children as in adults. Malocclusion may occur as early as the second or third year. The result, if the growth of the jaw is not stimulated, inevitably is malocclusion of the permanent teeth and consequent derangement of the anatomy of the face.

Dr. Riser's experiments have taught that there is a distinct relationship between dental caries and the alkalinity of the saliva. A diet consisting of foodstuffs, rich in calcium salts, increases the alkalinity and quantity of saliva, and he believes such a diet influences, in a marked degree, the quality of teeth. The use of a saturated solution of silver nitrate in the sulci of the molars will prevent, or at least retard, the action of decay, but the teeth should be examined from time to time and further treatment used if necessary.

When the tooth of a child is especially sensitive it is a good plan to remove some of the softened dentin, and place in the cavity a mixture of equal parts of Fletcher's dentin and silver nitrate, the cavity being previously dried. At the next sitting the cavity can be easily excavated.

Children's Permanent Teeth.—As the permanent teeth of a child require nearly the same treatment as those of an adult, with a few exceptions, I shall not attempt to go into that phase of the subject, but will deal more particularly with the filling of the cavities in the crowns of permanent teeth in children's mouths.

Dr. Black says if he can secure proper conditions in the mouth

and control the patient without jeopardizing his nervous condition, he prefers gold for a filling material, but deems it best to avoid the dread of operation, and if necessary to do temporary work and set a definite time for the permanent work. Dr. Ottolengui holds about the same idea, feeling, though, that he can nearly always secure the child's confidence and place a better filling of gold than with any other filling materials.

Since the advent of the gold inlay it seems to me that when gold is indicated, usually it would be unwise to subject the child to protracted operations, with the rubber cloth in position. The gold inlay eliminates the malleting and other unpleasant features, and is certainly a boon to suffering humanity. Other filling materials, which possess the characteristics to make them acceptable otherwise, are a constant source of irritation owing to their susceptibility to thermal changes. The cement which retains the inlay in place also serves to protect the pulp. If gold has been proven to be the best material for the preservation of adult teeth, why does not the same hold true in the care of children's teeth?—*Items of Interest.*

INDICATIONS FOR REMOVING ADENOIDS.—Thurber, in the Archives of Pediatrics, gives the following indications for removal:

The first and great indication for removing adenoids is that they cause nasal obstruction. As has been wisely said: "It is as unphysiologic to breathe through the mouth as to eat and drink through the nose." A small infant will struggle and fret when nursing when even a small string of ropy mucus is lodged in one naris. When there is a postnasal obstruction, the infant has to stop nursing to get its breath, swallows air and is generally disturbed. This leads to malnutrition very early in life. The author has removed good-sized masses from infants under two months old with immediate relief from this inability to nurse satisfactorily. He cites one negro woman who asked if her baby could nurse immediately after the operation; and she said later that it was the first meal that her child had really taken normally, and that it went off to sleep the picture of comfort.

A child with nasal obstruction will soon begin to sleep with its

mouth open and may in this way sleep fairly well, especially when there are no enlarged tonsils to stop up its throat. But even so, the normal way is often persisted in, and then it is that not enough sleep of the quiet, normal kind can be had. Besides the injury done to the upper air passages by mouth-breathing, there is the compression of the face, drooping of the jaw, sunken chest and stupid expression of the persistent mouth-breather. The child goes to bed stupid and wakes up pale and languid—the antithesis of the normal, healthy child.

A second indication is a chronic nasal catarrh, or running nose, which may be attended with frequent nose-bleeds. Every child should be taught to blow its nose as part of the regular morning toilet. If it cannot do this, something is the matter, and the most common condition in cases of this kind is postnasal obstruction due to adenoids, the acute colds, but a chronically running nose. This condition is often associated with a hacking cough, as though the child was clearing its throat. A very disagreeable habit may be formed right along this line.

A third indication is stuffy speech. Not so much the dampened tones due to enlarged tonsils, but speech lacking nasal resonance. "Common" is pronounced "cobbed"; "nose," "doze," and "song," "sogg." Many cases also of delayed learning to talk and talking so that only the mother can understand what the child is saying are relieved by removing the adenoids.

A fourth indication is a narrowing of the upper jaw and irregular crowding of the teeth. From a given permanent incisor or molar, a dental arch curve can be mathematically plotted, and this curve is always a well-rounded one in front. The high, narrow arch is abnormal and often seen in idiots. Secondarily, in these cases, we often find deviated nasal septa.

A fifth indication is deafness due to o. m. c. c. (chronic catarrhal otitis media), or to o. m. p. c. (chronic purulent otitis media). Children are sometimes accused of being inattentive in school when the real trouble is beginning deafness due to blocking of the eustachian orifices by masses of adenoid tissue. There is normally a small gland, called the tubal tonsil, situated just behind and above the posterior lip of the eustachian orifice. This on each side may be a lateral extension of a larger central mass or may

be independently enlarged. In either case a blocking of the orifice results in lack of proper ventilation of the middle ear.

A sixth indication is hypertrophic rhinitis, especially of the inferior turbinate bodies, which then form an anterior obstruction, which, if allowed to go on for months, will leave a nose still obstructed after the adenoids have been removed. Such a result is due to delay, and is one cause of failure of the operation to give that relief which has probably been promised to the parents.

A seventh indication may be classed under the reflex disturbances—enuresis, asthma, hay fever and epilepsy. Even if the adenoids in a given case do not seem to be large enough to cause any local symptoms, the physician may have sought in vain for some cause of one of the above lesions in his nervous child, and, as a last resort, decided that it might be well to have its adenoids removed. A large number of cases are on record as much improved or cured by this procedure—*Medical Standard.*

Psychic Treatment of Nervous Disorders.—Penrose takes exception to the current idea that the mass of people who have become interested in psychotherapy have really been driven into it by the neglect of the profession at large. He considers that it is rather due to a certain degenerate type of mind fast spreading over the land. This consists in a certain mind weariness, a reaction against the strain and turmoil, the ambition and excessive restlessness of the present day. The Christian Science Church typifies a disinclination to think, so that some simple theory is evolved which shall explain everything to the individual's satisfaction, letting him out of most of the worries of life, and it may thus help posterity, by the induction of a resting or spore stage for the race. He urges caution in turning a mind from the ideas which often it has evolved from its own outwornness, and which in the presence of a poor state of bodily nutrition may be its haven of rest. The body should be built up and the psychic change made later. Has anyone, he asks, ever seen a perfectly organically healthy man or woman who could long remain unhappy? When a man is in the "pink of condition" he is also happy for the most part. Penrose regards it as very dangerous that even the purely functional neuroses should be turned over to untrained physicians for treatment, owing to the frequent impossibility of determining what is organic and what is functional, or how dependent the mental state is on an ill-nourished body.—*Journal Amer. Med. Assn.*

The Dental Digest.

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All communications relating to the editorial department should be addressed to Dr. J. P. Buckley, Editor, 163 State Street, Chicago.

Editorial.

HOW CAN THE LARGE LOCAL DENTAL SOCIETIES INTEREST THEIR ENTIRE MEMBERSHIP?

It is gratifying to note the interest generally manifested throughout the country in the organization or reorganization of both local and state societies. Four years ago the Illinois State Dental Society, for years one of the strongest organizations in the profession, recognized its limitations and adopted a plan of reorganization by which its membership was increased from about 10 to 40 per cent of the reputable dentists of the state. The plan provided that no dentist could join the state society without first being a member of the local society of the county in which he lived. In other words, membership in the state society was only obtainable through the local society—thus the membership of the latter was materially increased.

Inasmuch as many other states are reorganizing along similar lines, we deem it wise at this time to call attention to a problem which confronts all large local societies. To illustrate this problem, we will take the Chicago-Odontographic as an example. At the present time the number of members in this society is something over 850; and it is the intention of the officers to increase the membership to 1,000, which can easily be done, as committees have been appointed and are working diligently to enlist all desirable men. There are many difficulties which naturally arise in the management of such a large society; but there is one which is gradually growing in importance as the societies' membership increases, and that is: How can the interest of the members be aroused and held in society work? Much depends upon the character of the program; and yet, with the most enticing program, it is evident that at the most only 10 or 12 men can take an active part in the papers and discussion of an evening; and it is the

experience of those who have engaged in society work that unless you give the members something to do, their interest naturally wanes.

A post-graduate course such as that to which we have elsewhere referred is a step in the right direction; but this will be more beneficial to the component societies throughout the state than to local societies in the larger cities. Every effort should be made to discourage the organization of independent societies, as this brings us back to the former condition of disconnected and unrelated organizations which the present scheme of reorganzation was intended to remedy.

The medical societies of Chicago and Philadelphia have found a successful solution of this same problem. They have divided the city into districts and organized in them branch societies subordinate to and forming a part of the main city society. Surely something similar to this must be adopted by the Chicago-Odontographic and all other local societies having to contend with the problem of interesting a large number of men.

THE ILLINOIS STATE DENTAL SOCIETY'S POST-GRADUATE STUDY COURSE.

The Illinois State Dental Society has announced through its Monthly Bulletin a plan for a post-graduate course of study which promises to be far reaching in its effect on dental society work and in the dissemination of knowledge of the literature of dentistry. The plan is worthy of the most careful study by men who are interested in society work and in the general progress of the profession. It offers, in a variety of ways, courses of study that are systematic and yet ever changing and always up to date. It is available for use in one way or another by each of the fifteen hundred members of the Illinois State Society and by other individuals or societies that have access to the journals selected. This appears to be the most practical plan yet devised by which the individual dentist may, without unnecessary reading, keep abreast of the times; by which he may know exactly where to find information on any point that may come up in his daily practice; by which he may obtain, with the least possible effort, information and material for a paper or discussion before a soci

ety; by which the program committee of a society may easily arrange a systematic program for one or a series of meetings, and at the same time give the members who have heretofore hesitated to take an active part in society work something to do and in such form that they can do it with credit to themselves and to the society.

One of the most important results of the development of the course, if it is adopted by other societies, and carried along for several years, will be its effect on the dental journal literature. The classification of journal articles in such a way that they will be easily accessible in after years promises to eliminate much of the repetition now occurring in our literature. It is not too much to hope that the initiation of this scheme may finally result in a permanent classification of practically all of our dental literature, from the publication of our first journal in 1839 to the present time.

The simplicity of the plan is the best argument in favor of its practicability. In brief, it involves the classification of the articles appearing in selected journals upon a simple plan by which all of the articles on each subject are grouped together. Various subjects are then assigned to men well qualified to read the articles on their respective subjects, and as they read, they formulate questions that are answered in the articles, noting after each question the volume and page on which the answer may be found. The questions covering each subject are then properly arranged by the committee in charge and published.

The literature of dentistry is classified under nine principal headings, as follows: General Articles on Dental Education, Schools, etc.; Operative Dentistry; Prosthetic Dentistry; Orthopedic Dentistry; Oral Hygiene; Dental Pathology, Materia Medica and Therapeutics; Oral Surgery; Dental Jurisprudence and Ethics. Each of these has a number of subdivisions, and the questions will be arranged in accordance with the subdivisions. As the course is presented to the profession for use, it will consist of systematically arranged groups of questions, covering every phase of dentistry, and after each question will be printed the volume and page numbers in the various journals where answers may be found. There may be a dozen index references for a single ques-

tion, directing the searcher to the opinions of several men on the particular point.

The Illinois State Dental Society has, for a beginning, selected four journals—DENTAL DIGEST, Dental Cosmos, Dental Review, Items of Interest, and its own transactions, all for the last five years, and proposes to furnish its members with a classified list of questions on each of the subjects mentioned above, and following each question will be references to the answers to be found in the volumes mentioned. In order that the journals may be readily accessible to the members of the society, committees are at work in about forty cities scattered throughout the state and the list of journals mentioned will be placed in the public libraries in these cities. There will also be two circulating libraries, one in Chicago, the other at Sparta, in the southern part of the state. It is the intention to continue the course, indexing the new numbers of the journals selected as they appear, and also to add other journals to the list as rapidly as possible.

ARTHUR D. BLACK.

Correspondence.

EROSION INFORMATION WANTED.—A REPLY.

Dr. Arnold, in his request for information concerning the treatment of erosion in the August number of the DIGEST, seems to have confused erosion and hypersensitiveness of the teeth. The method he gives as his own practice, as I understand him, relates to sensitiveness of the teeth, due, it is presumed, to gum recession. Erosion is a loss of tooth tissue, due to causes at present unknown. How it is brought about seems to be fairly well explained, but why the cause should exist at all, why almost exclusively confined to one period of life, and its erratic behavior, has so far baffled the keenest observers.

While erosion is at times accompanied by hypersensitiveness of the teeth affected, quite as frequently it is not, especially a short time after its first onset. Sometimes remedial measures appear to arrest its progress, at other times it steadily progresses in spite of all that has been done. It is not always continuously progressive. Quite frequently it stops for a while, and may have long periods of rest, so it is not always safe to assume that its arrest is a result of treatment.

Sensitiveness of teeth whose roots are exposed by gum recession is quite another matter, and far more tractable. It has been my practice for many years to recommend in such cases the local application of sodium

bicarbonate, pressing the dry powder between and around the teeth. A few applications usually give prompt relief. The constant use of phenol sodique, diluted so as not to be unpleasant, and freely used with the tooth brush, or as a mouth wash, has proved very satisfactory in keeping denuded teeth comfortable. For several years I have been recommending sodium bicarbonate as a tooth powder, and am favorably impressed with its effectiveness, especially in cases where erosion or gum recession is marked. It is at least harmless.

I am disposed to ask whether oral sterilizing is not being carried too far, whether it is not being used injudiciously, and without really understanding what it means. To sterilize is to kill. All germs are not bad germs, and some germs are bad only when out of place. When we undertake to sterilize a tooth, or a portion of a tooth, by forcing the sterilizing agent into its tissue, are we making that tooth a better tooth? If we succeed, we have a dead tooth, and a dead tooth is soon lost. A devitalized tooth, so called, is not dead. It is very fortunate that it is almost impossible to thoroughly impregnate a tooth while in the mouth with any sterilizing agent. A surgeon floods the field of operation with a sterilizing agent, and thereby obtains wonderful results. He does not, however, endeavor to force mercury bichlorid into the tissues on which he operates. Now and again some is absorbed; then, there is another story to tell!

It will be interesting to know whether Dr. Arnold finds that the paraffin treatment arrests the loss of tooth substance by erosion. The late Dr. Bonwill was, perhaps, the first to suggest paraffin as a tooth decay arrester, flowing it around fillings before removing the dam. I have used it in children's teeth as a kind of "breaking in operation," quite painless in its application, and at times surprisingly effective.

The question should be more explicitly stated. Erosion may be progressing rapidly without the least discomfort, teeth may be exquisitely sensitive and no erosion. Remaining comfortable is no sign that the erosion is arrested, a return of sensation is no sign that it has recommenced. How to arrest erosion is a vexed problem. As the problem now stands it seems to call for other treatment than mere operative procedures.

Yours truly,

WILLIAM H. TRUEMAN.

Philadelphia.

Bibliography

OPERATIVE DENTISTRY.—By G. V. Black, M.D., D.D.S., Sc.D., L.L.D., Dean and Professor of Operative Dentistry, Dental Pathology and Bacteriology, Northwestern University Dental School.

In recent years there has scarcely been a writer but who, in referring to our literature, has lamented the fact that we had so few standard textbooks on dental subjects. This will no longer hold true with operative

dentistry, for Dr. G. V. Black has presented to the profession a work on this subject which epitomizes his life work.

The work appears in two volumes—the first, of about 300 pages, on "The Pathology of the Hard Tissues of the Teeth,' and the second, on "Technical Procedures in Filling Teeth," contains something over 400 pages. Both volumes are richly illustrated, having 674 drawings, photograph and photomicrographs, which, with few exceptions, are original with the author.

This work is essentially a treatise on the *pathology and treatment of the hard tissues of the teeth,* and represents the systematic and detail work of a long and useful life. Dr. Black has long been considered one of the most thorough and careful scientific investigators of the profession. The work, from the introductory to the last chaper in the second volume, shows that system and painstaking detail which has characterized the author in all his work.

No effort will be made here to review the work in detail; but there is one thing which is especially interesting and which should be emphasized, viz., Dr. Black has written two large volumes on Operative Dentistry without any reference being made to the treatment of the dental pulp, the pericemental membrane or other tissues adjacent to the hard tissues of the teeth. The writer could never understand why Dental Therapeutics should be included in Operative Dentistry by so many writers. Dental Therapeutics is a branch distinctly by itself, and it is hoped that the presentation of this work by such an authority as Dr. Black will forever plainly establish a line of demarcation between these subjects.

A work of such scientific and practical value as this is welcome at any time, but it is doubly so at this particular time, when there is manifested by the profession such a great tendency to abandon the methods herein so well described and which have contributed so largely to the high regard in which dentistry is held today. The author and the publishers are to be complimented, and the profession is to be congratulated on the appearance of this work. No teacher, student or practitioner of dentistry can afford to be without this book. It is published by the Medico-Dental Publishing Company, 87 Wabash avenue, Chicago. The regular edition, bound in buckram, sells for $10.00 and the special edition, bound in half-morocco, for $20.00.

PRINCIPLES AND PRACTICE OF FILLING TEETH WITH PORCELAIN.—By John Q. Byram, D.D.S., Professor of Prosthetic Dentistry and Dental Ceramics, Indiana Dental College, Indianapolis.

At this time, when the cast gold inlay and the silicate cements are claiming so much attention from the profession, it is fitting, indeed, that a work should appear which champions and emphasizes the value of porcelain as a filling material, for perhaps porcelain has done more to impress the laity with the eagerness of the dental profession to give them the very best possible than any other one material.

Because of over-enthusiasm on the part of certain practitioners, this material came into ill repute; but, as the author of this book says:

"Porcelain will hold its place as a filling material, and every conscientious dentist should use it where indicated. The practice of disfiguring patients by filling conspicuous cavities with gold should be discontinued, for he who uses good judgment in the selection of filling materials serves his patients best."

The work appears in a neatly bound volume of 120 pages, and both the author and the publishers are to be congratulated on the profuse and beautiful manner in which it is illustrated, having an average of over one original illustration to the page. Not only is the book deserving of a place in the library of every dentist, but its subject matter should be mastered, that the public should have the benefit of good judgment on the part of dental practitioners in the selection of the best material for filling a cavity in a given case, be it porcelain or other material.

The book is published by the Consolidated Dental Manufacturing Company of New York, and sells for $2.00.

Obituary.

NIEL HAZEN, a dentist of Jackson, Mich., died August 1, 1908.

A. O. HOOKER, a pioneer dentist of San Jose, Cal., died August 28, 1908.

W. C. S. BARRY, 25 years old, a promising young dentist of Meriden, Conn., died from stomach trouble, August 14, 1908.

CONRAD F. KRENWINKEL, 34 years old, a dentist of Aurora, Ill., died from cirrhosis of the liver, August 28, 1908.

HENRY C. WIDUP, 66 years old, a retired dentist of Columbia City, Ind., died from diabetes, August 2, 1908.

C. P. DENNIS, 75 years old, a dentist of Portsmouth, O,, died suddenly August 4, 1908.

GILBERT E. CORBIN, 78 years old, one of the oldest practicing dentists of Michigan, died at St. Johns, August 8, 1908.

J. O. WELLS, 37 years old, professor of crown and bridge work in the University of Minnesota, died of acute pneumonia, August 26, 1908.

S. A. CHAPMAN, 46 years old, a dentist of Virginia City, Nev., died from an overdose of morphin taken to quiet his nerves, August 6, 1908.

ALBERT J. BUSHONG, 52 years old, a prominent dentist of Brooklyn, died August 18, 1908.

H. B. WELLER, 29 years old, a dentist of Tiffin, O., died from pneumonia, August 14, 1908.

WILLIAM H. MONROE, 85 years old, a well-known dentist of Chester, Pa., died September 1, 1908.

AARON L. NORTHRUP, 70 years old, one of oldest and most prominent dentists of New York City, died suddenly, in Paris, France, August 31, 1908.

F. B. DAWLEY, a dentist of Green River, Wyo., died suddenly, September 2, 1908.

ABNER C. CRYSLER, 76 years old, a dentist of Niagara Falls, Ont., for more than 50 years, died August 29, 1908.

Notices.

MINNESOTA STATE BOARD OF DENTAL EXAMINERS.

The next regular meeting of the Minnesota State Board of Dental Examiners will be held at the Dental Department of the State University in Minneapolis, Minn., on Nov. 10, 11, and 12, 1908. All applications must be in the hands of the secretary by Nov. 1. For further information address:

GEO. S. TODD, D.D.S., Secy.
Lake City, Minn.

OHIO STATE DENTAL BOARD.

The State Dental Board of Ohio will meet in regular session in Columbus, on Oct. 20-23, 1908, for the examination of applicants for license to practice dentistry in this state.

Only graduates of reputable dental colleges are eligible to appear for examination.

All applications must be in the hands of the secretary at least ten days before the date of the examination, together with the fee of $25.00.

For further information and blank applications address the secretary,

F. R. CHAPMAN, D.D.S.,
305 Schultz Bldg., Columbus, O.

NATIONAL DENTAL ASSOCIATION.

At the twelfth meeting of the National Dental Association, held in Boston, Mass., July 28 to 31, 1908, the following officers were elected for the ensuing year:

V. E. Turner, Raleigh, N. C., President; Wm. Crenshaw, Atlanta, Ga., Vice-President for the South; Eugene H. Smith, Boston, Mass., Vice-President for the East; W. T. Chambers, Denver, Colo., Vice-President for the West; H. C. Brown, Columbus, O., Corresponding Secretary; Charles S. Butler, Buffalo, N. Y., Recording Secretary; A. R. Melendy, Knoxville, Tenn., Treasurer.

Executive Committee, new members, J. D. Patterson, Kansas City, Mo.; C. J. Grieves, Baltimore, Md.; H. B. McFadden, Philadelphia, Pa.

Executive Council, H. J. Burkhart, chairman, Batavia, N. Y.; B. Holly Smith, Baltimore, Md.; F. O. Hetrick, Ottawa, Kan.; A. H. Peck, Chicago, Ill.; W. E. Boardman, Boston, Mass.

Birmingham, Ala., was selected as place for 1909 meeting.

H. C. BROWN, Cor. Secy.,
185 East State St., Columbus, Ohio.

NORTHERN INDIANA DENTAL SOCIETY.

The annual meeting of the Northern Indiana Dental Society was held at Fort Wayne, Sept. 8-9, 1908, and the following officers elected for the ensuing year: President, W. R. Meeker, Peru; Vice-President, J. A. Dinwiddie, Lowell; Secretary, W. O. Vallette, Goshen; Treasurer, J. F. Peterson, Milford; Supervisor of Clinics, J. W. Stage, Goshen.

The next meeting will be held at Goshen, in 1909.

W. O. VALLETTE, D.D.S., Secy.,
Goshen, Ind.

NORTHEASTERN DENTAL ASSOCIATION.

The fourteenth annual meeting of the Northeastern Dental Association will be held in Hartford, Conn., Foot Guard Hall, 159 High street, October 21, 22, 23, 1908.

A good and profitable meeting is expected. Ethical members of the profession, especially in New England, are invited to attend, and if members of their respective state societies, are asked to join the assoication.

EDGAR O. KINSMAN, D.D.S., Secy.,
Cambridge, Mass.

LATEST DENTAL PATENTS.

894,983. Dental face-bow, J. H. Prothero, Chicago, Ill.
895,159. Producing amalgams or alloys, C. F. Carrier, Jr., Elmira, N. Y.
896,432. Tray for Instruments, C. F. Booth, Canandaigua, N. Y.
896,662. Rubber-dam holder and cutter, A. B. Prentis, Brandon, Ore.

News Summary.

NOTHING ELSE ADEQUATE.—The professor had just finished a lengthy lecture on poisons and antidotes. "Supposing you were called to attend a patient who had swallowed ten grains of oxalic acid, what would you administer?" "The sacrament," shouted an Irish student from the rear of the hall.—*London Opinion.*

TREATMENT OF PUNCTURE FROM INSTRUMENTS.—I have been punctured with instruments many times, and it is my invariable custom to drop the instrument at once and grasp the injured member above the puncture and hold my finger in that position until it bleeds profusely. I get as much blood out of it as I can, and possibly that is the best thing that can be done under the circumstances.—J. G. REID, *Dentist's Magazine.*

TO RELIEVE SORENESS.—Tincture of celendula applied to sore and inflamed gums will almost always give relief to the ordinary irritations associated with orthodontic treatments. Saturate a cotton pledget and press firmly over inflammation until it stings well or gives relief. This should require ten to fifteen seconds. It may bring the tears, but the

after-effects more than warrant its use and usually the little patient will ask for it on the occasion of the next irritation. V. E. BARNES, *Dentist's Magazine.*

FAIR WARNING.—Farmer Wayback starting home from the station).—"Please, ma'am, do you wear false teeth?"

Fair Boarder (for the summer).—"Sir!"

Farmer Wayback—"Oh, I don't mean to be curious. Only this road is a leetle rough, and ef your teeth ain't good and fast you'd better put 'em in your pocket."—*Exchange.*

VICTIM OF LOCKJAW.—Scott Dewey, a young clerk of Hornell, N. Y., is in a critical condition from lockjaw. He recently had an abscessed tooth extracted and after suffering for a few days the jaws set firmly and for five days he was kept alive by means of fluids forced down his throat. His condition is somewhat improved and doctors say he may recover.—Rochester (N. Y.) *Post Express.*

DEMISE OF MR. JOHN KERR.—It is with deep regret that we refer to the death of Mr. John Kerr, who passed away in Detroit on August 17, 1908. As president of the Detroit Dental Mfg. Company he had a large circle of friends, both among the dental profession and supply trade, all of whom will feel his loss keenly. Our sincere sympathy goes out to the surviving members of his family.

SUICIDES.—Edwin A. Talmage, a dentist of Philadelphia, committed suicide by firing a bullet into his brain, August 24, 1908. Dr. Talmage was well known as a dentist and also had some reputation as an artist, having a small studio in his home, where he spent most of his time. Warned some time ago that his health was failing, he persisted in his regular routine of work and continually brooded over his illness until the worry affected his mind and resulted in his fatal attempt on his life.

THE TACTFUL DOCTOR.—A physician in a small town in Northern Michigan got himself into a serious predicament by his inability to remember names and people. One day, while making out a patient's receipt, his visitor's name escaped him. Not wishing to appear so forgetful, and thinking to get a clue, he asked her whether she spelled her name with an e or i. The lady smilingly replied, "Why, doctor, my name is Hill."—*Success.*

ILLEGAL PRACTITIONERS.—Two dentists of Los Angeles, Cal., were fined $50 each, in August, for practicing without licenses. In one instance a suspended sentence of six months was also imposed, it being a second offense.—A dentist of San Francisco was convicted, September 1, of practicing without a license.—A dentist of Brooklyn, August 14, was held in $500 bail because of pulling teeth without being a licensed dentist.—Two dentists of Portsmouth, O., were arrested August 7, for alleged illegal practice, and placed under bonds of $300 and $400 respectively.—For the eighth time complaints have been filed aaginst two dentists of Ogden,

Utah, it being alleged that they are practicing without licenses. One of these dentists was recently convicted and sentenced to pay a fine of $60. He appealed to the district court, where the case is now pending.

FACIAL NEURALGIA.—Kiliani analyzes his results in fifty-five cases of facial neuralgia treated by Schlösser's alcohol injection method. The only surgical accident was a typical paresis of the oculomotor nerve, which lasted about four weeks. Out of the fifty-five cases he had three failures and one patient has had a recurrence. The remainder are, so far as he knows, free from pain, and of this fact he is positively sure in the case of forty-seven.—*Journal Amer. Med. Assn.*

CURE OF NERVOUS ERUCTATIONS.—Saito's patient for thirty-six years had been accustomed to have an hour or so of loud and annoying eructations every evening. If she did not thus get rid of the "gas" in her stomach she was unable to sleep. He convinced her that the trouble was due to her habit of swallowing air and cured her by having her wear a gag to keep her mouth open, with a vessel to catch the saliva, during the hours when she previously had had the attacks.—*Journal Amer. Med. Assn.*

GIRL SUED AS DENTIST, FREED.—"The law does not include the cleaning of teeth in the practice of dentistry," said Justice Boyer of Evanston, Ill., in discharging Miss Mary Leaf, who had been arrested on a complaint by the state board of dental examiners that she had practiced without a license. She is employed in the office of W. W. Johnson, a dentist at 845 Chicago avenue, Evanston. The evidence showed that Miss Leaf had cleaned the teeth of William H. Glacker and Katherine Skeiler.—*Chicago Record-Herald.*

IODIN IN THE TREATMENT OF ULCERS.—Iodin painted over the skin up to the edge of an ulcer and then over the surface of the ulcer itself, will convert a septic ulcer into a clean, granulating wound which heals readily. Iodin in a concentrated form or as a saturated solution in alcohol is applied every day or as often as is required until the slough separates, when an ordinary dusting powder and gauze may be used. This treatment will quickly change a phagedenic ulceration into a healty condition; it is also serviceable in mouth and throat troubles, and will arrest and cure pyorrhea alveolaris. The application is usually painless.—J. W. ROOP, *Jour. Amer. Med. Assn.*

HYPEREMIA A GERMICIDE.—Johns, in the *Medical Council*, asserts that hyperemia is fatal to bacterial life, which are made harmless and eliminated. There is not another feature in the Bier method that is so well proven and so worthy of note as this. Just how bacteria are destroyed is part of another story. Writers are by no means a unit in the support of any one underlying theory. The leucocytes are the militia of the blood. Hyperemia is a call for mobilization. It brings to the scene of internal revolt a victorious army. We have abundant evidences of victory by this army, e. g., the hyperemia treatment of acute inflammtions, (1) the eva-

nescence of febrile action, (2) the arrest of suppuration, (3) the absorption and harmless elimination of a limited quantity of pus, (4) the prompt transmutation of an acute abscess into a cold abscess, and (5) the speed by which many acute infections are nipped in the bud.—*Medical Standard.*

War on Nostrums.—At a joint meeting of the Chicago Medical Society and the Chicago Retail Druggists' Association war on "patent medicines" and other proprietary remedies which induce harmful habits of self-medication was agreed on. The object was to ally the two associations in a co-operative fight against nostrums of all kinds and the responsibility for the popularity of such compounds was placed at the door of everyone handling the drugs, from the manufacturer to the prescriber and the dispenser. Dr. Henry B. Favill, president of the Chicago Medical Society, was chairman.—*Journal Amer. Med. Assn.*

Septal Deviations.—H. P. Mosher, in the *Laryngoscope,* states that there are two great causes of deviations of the septum—trauma and asymmetry of growth. Of late, he declares, trauma has been held to play only a minor part; the tendency has been to consider unequal development of the two halves of the head the chief cause. This is true in some cases, but more often the inequality of growth is confined to the bones forming the hard palate, namely, the superior maxillæ, the palate bones and the premaxillæ. Mosher declares that the irregular and delayed eruption of teeth, especially the incisors, is responsible for this asymmetry in a large number of cases.—*Journal Amer. Med. Assn.*

Lockjaw from Bad Teeth.—Larkin Cockrell, son of Dr. and Mrs. Bruce Cockrill of Bloomfield, Cal., is the victim of lockjaw from a peculiar cause. The young man had some decayed teeth in his lower jaw and the poison from these decayed molars got into his system and caused tetanus. The decayed teeth had caused a severe ulceration of the tongue, which caused blood poisoning, and resulted in setting the lower jaw in rigidity. Chloroform was administered and the jaw pried open sufficiently to remove the teeth, and the tongue, mouth and jaw were curetted and treated. The case is unusual, and the doctors believe that, now the cause has been removed, the young man will recover and no after-effect will remain.—Tucson, Ariz., *Citizen.*

To What Dangers Are Our Eyes Exposed, and How Can We Protect Them?—The unprotected eye can easily be hurt during extractions, in removing tartar, or in breaking off parts of teeth. With the mechanical injury a serious infection of the eye generally goes hand in hand, which may lead to complete or partial loss of the dentist's eyesight, or at least render him unfit for work for weeks. Injuries may also result from spattering acids and caustics, from the use of instruments with double ends—which can easily hurt the operator's eye if the patient suddenly moves or the operator be myopic—also during work in the laboratory. For all these reasons Dr. Senn urgently advises the constant use of stout protective spectacles or pince-nez. He also adds some good advice as to

favorable light conditions in the practitioner's operating room, and emphasizes the great care to be taken in the daily hygiene and in the preservation of the eyes, these being the conditions essential to the dentist's success. —Dr. A. Senn, *Dental Cosmos.*

A Few Dont's for Office Practice in Suspected Syphilis.—Don't forget to sterilize your instruments. Don't hold your instruments in your mouth. Don't think every ulceration in the mouth is due to an irritation of the teeth alone. Don't think you are immune. Don't think all your patients are born under lucky stars and will never get it through you or your instruments. Don't allow social position or gender to influence your diagnosis. They say that animals—lower animals, I mean, are immune from it. Don't forget that mucous patches are as infectious as chancres. Don't depend too much on what patients may say in answering your questions when you suspect syphilis, because they may not know it, and I'd rather have it said: "You have made a mistake" than "You have syphilis."—C. I. Hansen, *Pacific Dental Gazette.*

Marriages.—R. G. Nordgren, a dentist of Rockford, Ill., was married to Miss Jennie Benson of Swedesburg, Ia., September 9.—Maynard Marquis, a dentist of Buffalo Prairie, Ill., was married to Miss Bess G. Thornton of Keithsburg, September 2.—LeRoy L. Farmer, a dentist of Deering, N. D., was married to Miss Mamie McCormick of Keokuk, Ia., August 12.—Walter E. French, a dentist of Everett, Mass., was married to Miss Angie J. Ballard of Malden, August 25.—J. F. Smith, a dentist of Zanesville, O., was married to Mrs. Ella Smith, also of Zanesville, August 25.—Dennis G. Welch, a dentist of Waldo, O., was married to Miss Florence Maloney of Ashley, August 22.—John J. O'Kane, a dentist of Wheeling, W. Va., was married to Miss Elizabeth Altmeyer, also of Wheeling, August 26.—W. F. Corbett, a dentist of Houghton, Mich., was married to Miss Mildred Herner of Oshkosh, Wis., August 12.—Charles Seehase, a dentist of Manitowoc, Wis., was married to Miss Pearl Peterson, also of Manitowoc, August 26.

Fatalities.—John Brew, of Valona, Cal., died August 18 of blood poisoning caused by the removal of a tooth.—Miss Effie Lane, 22 years old, of Pomona, Ill., died August 21, from blood poisoning resulting from the extraction of four teeth.—Miss Eliza Clark, Marshalltown, Iowa, died August 15. The extraction of a tooth ten days previous caused the rupture of a blood vessel, resulting in paralysis.—Samuel O. Daniels, 54 years old, a newsdealer in North Grafton, Mass., died August 12, while under the influence of laughing gas in a dentist's office. Death was due to heart failure.—Miss Annie Donovan, 28 years old, of St. Louis, Mo., died September 7. While seated in a dentist's chair receiving an anesthetic preparatory to having a tooth extracted, she became unconscious and died a few minutes later.—Bernice Shaw, 21 years old, of Bellingham, Wash., died in a dentist's chair of paralysis of the heart while under the influence of chloroform, August 26.—Simon Landacre, 65 years old, of Dela-

ware, O., died in the office of a dentist while under the influence of chloroform for the extraction of fourteen teeth, August 14. The operation was nearly concluded when the patient died.—Dr. J. F. Roberts, a dentist of Paris, Ill., died August 3, after an illness of four hours from blood poisoning caused by an abscessed tooth.

MIXING CEMENT.—When you mix cement, *mix it;* don't just pretend to. Have a clean glass or porcelain slab, big enough to mix on properly; and have it *clean.* Don't use a paper slab, as the paraffin wax of the paper will mix with the cement, no matter what the manufacturer says about his paper being absolutely impervious. Paraffin is all right—in its place—not in cement. Spatulate the cement quickly and thoroughly—don't be afraid to work at it. Work the cement till it is "smooth," and then stop. Too much mixing is just as bad as not enough. Spread the cement evenly and quickly on the band to be cemented, then dry the tooth; when dry, apply; the cement has firmly adhered to the band by this time, and the band being applied the instant the tooth is dry has a much better chance of thicking than if the tooth is dried first and the cement then mixed and applied—there are so many chances for it to get wet the latter way. These remarks apply equally well to cement mixing for crown and bridge work as for orthodontia bands.—*Western Dental Journal.*

REPORT ON STANDING OF AMERICAN DENTIST ABROAD.—The tabulation committee, connected with the National Board of Dental Examiners and the National Association of Dental Faculties, has performed an important work in the last few months in collecting data on the standing of the American dentist abroad. Dr. Alphonse Irwin of Camden, N. J., is chairman and his associates are Dr. John F. Dowsley of Boston and Dr. J. G. Reid of Chicago. Dr. Irwin reported to his committee, at the meeting of the National, and the committee in turn reported to the two organizations, having communicated with the United States consuls-general in all the civilized countries and received detailed answers from forty-five, and the answers show what the rights of American dentists are in those countries. It is the first time such data has been collected, and it is regarded as highly important to the profession in this country. In his communication to the foreign countries, Dr. Irwin asked: "What will be required in your country of an American possessing a diploma from a reputable American college such as Harvard, University of Pennsylvania or University of Michigan, in order to secure permission for a license to practice dentistry? It appears in the answers that in the Netherlands, Austria, France, Italy, Spain and in Switzerland, the American dentist must enter some of the designated colleges and pass an examination before the college faculty. In Russia he must not only pass an examination in the Russian language, but he must practice for two years with a Russian dentist as his assistant before he can be licensed to practice independently. Japan has a reciprocity system, and the treatment of the American dentist in that country will depend upon the treatment a Japanese dentist receives

in America. The power of giving a license rests wholly with the Secretary of State for the Home Office at Tokio. Mexico has a commercial system, basing the rights of a foreigner upon his registration and payment of a monthly fee. In all countries there are some regulations indicative of the importance that attaches to dentistry everywhere.

A Migratory Needle.—The question as to whether or not a foreign substance can migrate in the human body was raised recently at an autopsy conducted by Professor Sternberg on the body of a man aged 45, who had died suddenly. At the post-mortem four fragments of a needle, each about one inch long, were found in the subcutaneous fat of the abdominal wall. The pericardial sac was filled with liquid blood and its anterior and posterior walls each showed a fine slit-like opening; two similar slits were found on the pulmonary artery, above the valves, and penetrating the lumen of the vessel. No other injury was visible. The slits were undoubtedly due to the piercing action of the needle fragment, which might have been carried away by the blood stream or have been one of the fragments found in the abdominal wall. We have no positive knowledge of the rate of movement of foreign bodies in the human organism. The findings in the pericardial sac permit the supposition that the needle penetrated the anterior aspect of the sac, pierced the artery, and left the sac on its posterior aspect a short time before death, as there were no signs of any respiratory changes in the lungs.—*Journal Amer. Med. Assn.*

Free Dental Dispensary of the Rochester Dental Society.—According to the last report issued by the board of directors of the above institution, the work accomplished for each succeeding year since the inception of the plan shows a material advance over its predecessor. To recapitulate, briefly, the 1905 report listed 711 operations performed on 342 patients. For the year 1906 the operations had increased to 2,107 and the number of patients to 680. Last year, 1907, the operations numbered 3,175 and patients treated 966.

Such figures, we believe, speak louder than words, and form a striking testimony of the scope and usefulness of this dental dispensary.

The expenses of maintenance have, heretofore, been assumed, for the greater part by Mr. Henry Lomb, a philanthropic citizen of Rochester, the balance being found by the Rochester Dental Society. Mr. Lomb, however, died on June 13 last, so that other sources of revenue have to be discovered if this worthy work is to be continued in accordance with present plans. Heretofore the larger part of the material and supplies needed have been donated by manufacturers. In this connection we quote herewith from the aforesaid report:

"The yearly expenses approximate $2,000, of which Mr. Henry Lomb has furnished the major portion, the society the balance.

"It is estimated that the supplies necessary for the work would, if purchased in the open market, cost approximately, $25 per month, a total of $300 per year. The Dispensary started with a full supply of materials

It is now in its fourth year, and they are about exhausted and will soon need replenishing; small quantities have been purchased, pending an appeal to the dental dealers and manufacturers.

"Donations of cash, linen, and needed dental supplies will be gratefully received; contributions may be sent to the Board of Directors, care of the Rochester Free Dental Dispensary, 32 South Washington street, Rochester, N. Y."

DENTAL MANUFACTURERS' EXHIBIT.—Arrangements have been completed for the next Dental Manufacturers' Exhibit, to be held at the Hotel Sinton, Cincinnati, Ohio, on October 27, 28, 29, and 30.

The product of the leading Dental Manufacturers of the United States is fully demonstrated at these exhibitions, among them being the latest inventions in all lines of dentistry, and they are not only interesting but educational.

No expense is spared to make these exhibitions a success, and the location of the October exhibit is exceptionally good, being in the best hotel in the city.

Special arrangements have been made for the comfort and entertainment of the lady visitors, and the four days spent in the city can be filled in a most beneficial and interesting manner.

There is no fee of admission, buttons being furnished on application at the registration desk admitting the wearer to the exhibition hall and clinics at all times.

All dentists and their families are invited to attend, and special arrangements are being made for the out-of-town guests.

ROBBERIES.—Dr. F. W. Gleason, Sacramento, Cal., gold valued at $50, September 1.—Drs. Callahan, Weidlich and Beardsley, Bridgeport, Conn., dental supplies valued at $1.50, August 22.—Dr. D. B. Maloney, Sterling, Ill., material valued at $30, August 31.—Dr. Henderson, Evanston, Ill., gold valued at $15 and $6 in money, August 9.—Dr. C. M. Dowell, Elkhart, Ind., dental instruments, stamps and gold filling, August 4. January 18 he was robbed of goods valued at $40.—Dr. A. R. Ross, La Fayette, Ind., gold valued at $50, August 14.—Dr. W. W. Wood, Wichita, Kan., gold valued at $40, besides gold crowns and teeth, September 1.—Dr. C. H. Maynard, Fall River, Mass., supplies valued at $40.—Dr. Henry Schlecht, Carthage, Mo., supplies valued at $30, August 21.—Drs. O'Shancey, Moyer and Ide, Lockport, N. Y., supplies, principally gold, valued at $100, August 29.—Drs. Holcomb and Hill, Rochester, N. Y., gold and instruments valued at $200, September 5.—Dr. Mitchell, Parkersburg, O. gold plate valued at $12, September 4.—Union Dental Co., Salt Lake City, showcase broken into in broad daylight and five sets of teeth bearing diamonds and pure gold, aggregating $500 in value, August 19.—Drs. Mueller and McFarlane, Waukesha, Wis., gold valued at $28, in August.—Drs. Brown, Mason and the Boston Dental Parlors, Racine, Wis., gold valued at $50, August 19.—Dr. F. L. Morgan, Milwaukee, Wis., office entered while at lunch and eight

gold crowns and a bridge of four teeth taken, August 20.—Dr. G. E. Cleophas, Beloit, Wis., gold and platinum valued at $75, August 8.

DANGERS OF LOCAL ANESTHESIA.—Within the last ten days I have had four cases of infected finger, in which the finger had been lanced under the use of some freezing agent, and I desire to call attention to the facts that such agents should be used with care, and that there is danger connected with their use, the claims of the promoters to the contrary notwithstanding.

There was refrigeration to actual necrosis of tissue, varying from a narrow circle to entire width of the integument, over the second phalanx of the index finger, while the tissues underneath were completely necrosed to the bone, from 5 mm. to 2 cm. in diameter.

Being frozen and thus devitailzed, unless removed, the tissues are in a most suitable condition for further bad results. The treatment is self-evident.

In infected fingers, as generally seen, I find it better to distract a patient's attention by the use of constriction, thereby availing myself of the natural pressure intensified, which is lost under the other method. Immediately after incision the band is removed, the attention being still farther distracted, and the rest of the treatment is easy.—JAMES H. MORROWAY, M.D., *Journal Amer. Med. Assn.*

[Ethyl chlorid in the extraction of teeth or the desensitizing of dentin should be used with caution.—Editor, DIGEST.]

SUGGESTIONS AS TO THE BEST METHOD OF USING THE TAGGART INLAY WAX.—I hear from quite a number of dentists that they have some difficulty in using the inlay wax that Dr. Taggart has put upon the market. I think more explicit instructions in the use of this wax would not be amiss, for it does not seem to me that anyone who is doing inlay work is not living up to his possibilities if he does not secure beautiful results with it. To me it seems to be perfection in that it will not yield or bend when at the temperature of the mouth, and therefore one can proceed with the work with the delightful assurance that the wax has not become distorted in its removal from the cavity. It may be admitted that there is a "just right" point at which the material works best, but a little practice and experience will fit you for getting that point every time. The wax should be heated in water at the temperature suggested in the instructions, and it should be brought to the chair in a small reeceptacle containing the hot water, and carried quickly with the fingers to the cavity. My assistant has learned to tell the "just right" point by the slight change in color that comes with the proper heating. Passing over the instructions given for the forming of the wax in the cavity, another very comfortable feature is that on account of the unyielding nature of the wax when cool, much of the carving of cusps is most easily accomplished after the sprue is embedded in the wax inlay. The sprue is held in the fingers of one hand while the carving instrument is held

in the other. The sprue that comes with the Taggart outfit is of sufficient bulk to make the hold to the wax quite strong and tenacious. This permits of putting on the finishing touches out of the mouth.

I believe failure has come to some largely because they do not keep the inlay wax in the hot water until brought to the chair. If the wax is taken in the fingers in the laboratory and carried in this way to the chair, it naturally loses its heat and becomes too stiff.—A. W. McCandles, *Dental Review.*

Examining Board Affairs.—Governor Davidson of Wisconsin has reappointed Dr. Alexander Sprague of Green Bay, as a member of the state dental board for a term of two years.—The governor of Texas has reappointed Drs. H. W. Lubben of Galveston, J. M. Murphy of Temple, and Bush Jones of Dallas to membership on the state dental board.—At the annual meeting of the National Association of Dental Examiners, a step was taken towards uniformity in the matter of state requirements for the privilege of practicing dentistry, as determined by the official state boards of examination. The association voted to recommend to the various boards that they examine in sixteen subjects and ask at least ten questions on each subject. This is not binding upon any of the boards, and it was pointed out in the discussion that it would be unwise to cause the boards to lose their individualities, but it sets a standard and the requirements in the several states will be uniform to the extent that the recommendations are followed. They are said to be a fair average of what is required now, some states having more than others less rigid examinations. The sixteen subjects enumerated are these: Anatomy, physiology, histology, materia medica, therapeutics, anesthesia, pathology, chemistry, operative dentistry, prosthetic dentistry, bacteriology, metallurgy, oral surgery, crown and bridge work, hygiene and orthodontia.

Sarcoma Simulating Alveolar Abscess.—A young lady of seventeen years of age came to me from a distant town for the treatment of what she supposed was a stubborn alveolar abscess, her local dentist having failed to relieve her. There was a tumor, as large as half an English walnut, occupying the palatal surface of the mouth, and an unusually severe looking fistula over the lateral incisor. A dentist whom I called in for consultation thought a dead pulp in that tooth was the cause of the trouble. Dissenting from this opinion, I called into consultation a throat-and-nose specialist. He pronounced it necrosis, and under somnoform anesthesia he operated through the fistula, removing a considerable amount of a glue-like, bony substance. The case was then treated with packings of iodoform gauze for three months, by her home physician; then the patient returned, as the swelling had not in the least abated. A second operation was performed, and after another six months the swelling was still as large as at first. Finally, under chloroform anesthesia, a more radical operation was performed by a general surgeon, and a microscopic examination of the tissues removed showed that the swelling was a round-celled sarcoma,

having no relation whatever to the teeth, yet incidentally involving two of them, the lateral and the central incisors. Both teeth, when removed, proved to have live pulps. This case forcibly suggested alveolar abscess, when in reality it was a sarcoma, which had originated in the antrum.—FRANK W. SAGE, D.D.S., *Dental Cosmos.*

POTASSIUM CYANID POISONING.—Potassium cyanid poisoning is not infrequent among workmen who "clean up" in the cyaniding process of gold reduction, but is rare in private practice.

After the auriferous ore has been crushed to a fine sand through which an 0.5 per cent solution of potassium cyanid is allowed to filter, the solution passes into boxes filled with zinc shavings on which gold is precipitated from the auropotassic cyanid in the solution. It requires some little force to dislodge these gold particles, and consequently scrubbing the zinc shavings with the hands is the method usually employed. It is in this scrubbing process, while the hands and arms are necessarily bathed in the solution, that poisoning occurs with greatest frequency. Different individuals exhibit different degree of susceptibility, some being apparently immune. The temperature of the solution greatly modifies the ease with which the effect is produced, the greatest number of cases occurring during the cold season when the solution is, of course, very cold.

Case 1.—A husky young man of 23 was having his first experience in scrubbing the zinc shavings. An itching sensation immediately followed the immersion of his hands in the solution. Scarlet specks soon appeared, irregularly distributed over the area with which the solution was in contact. These scarlet specks quickly enlarged until a well defined circumscribed area was produced, these finally coalescing and forming a large scarlet area, but the initial specks or papules maintained their identity, being slightly elevated and of a deeper color than the neighboring skin. The itching continued for about two hours, and a burning, uneasy sensation developed, which persisted until the redness began to disappear, twelve hours later. Slight giddiness and headache were the only constitutional symptoms.

A similar case occurred in a well-nourished metallurgist. I put the hands and arms of these patients into a very dilute solution of hot sulphuric acid for several minutes every hour. The redness soon began to fade and had disappeared altogether in twelve hours. The following equation shows the chemical reaction:

$$H_2SO_4 + 2\ KCN = 2\ HCN + K_2SO_4.$$

The prussic acid evaporates and is absorbed and eliminated rapidly and the heat facilitates the absorption and elimination of the potassium sulphate. —J. W. NOLAN, *Journal Amer. Med. Assn.*

SURGICAL VALUE OF IODIN.—Dannreuther, from his experience with iodin, is convinced that it is an agent of high germicidal potency of the utmost value and endowed with remarkable penetrating power. The tincture is the most available form. He has used it repeatedly without a single case

of iodism. In minor surgery wounds he has made it a practice, after thorough toilet, to inject tincture of iodin directly into the wound with an ordinary medicine dropper. Every such wound so treated has healed by primary union. He considers this the best method of procuring sterilization of a dirty wound. In erysipelas the painting of the eruption and a generous border of healthy surrounding skin with the tincture has checked the extension of the rash. It is useful for stimulating sluggish granulations and limiting the extension of the process in gangrenous ulcer. In major surgery a 1 per cent watery solution of iodin and potassium iodid may be used for sterilizing the hands. The tincture is an excellent agent for sterilizing the skin before an incision. He believes Goelet's method of irrigating the abdominal wound, after closing the peritoneum, with a solution of one dram of the tincture to two pints of water, a valuable measure. In gonorrhea in the female, after the patient has emptied the bladder, a solution of iodin, half a dram of the tincture to two pints of water, is injected directly into the urethra and bladder, allowed to remain a minute or two, and then voided. The process is repeated daily until edema of the vulva appears, when the injections are replaced by potassium permanganate 1 to 5,000 douches. One dram of tincture of iodin to four ounces of glycerin on a tampon is a valuable method, the author asserts, of procuring pelvic counter-irritation. After curetting for endometritis or abortion, the uterus may be swabbed out with full strength tincture, or an intrauterine douche may be used. He also recommends it as a prophylactic against possible infection and post-partum hemorrhage. He does not believe that the value of iodin in surgery is appreciated to the extent it deserves.—*Journal Amer. Med. Assn.*

[Iodin, in some of its various preparations, is one of the best agents to use after the thorough curettment in pyorrhea work. Talbot's formula for glycerol of iodin is most excellent:

℞ Zinc iodidi ..... gr. xv
Aquæ ..... m. x
Iodi (crys.) ..... gr. xxv
Glycerini ..... ℥j-m.

Sig.—Dry gum and gently work the remedy down into the pocket and over the entire septum of gum. After a few moments, spray the mouth with a pleasant antiseptic solution.—Editor, DIGEST.]

FATAL ANEMIA.—Rowley discusses with great detail the occurrence of extensive phagocytosis of red blood corpuscles and leucocytes by leucocytes in the peripheral blood in a case of anemia in a young man 27 years old, who had aortic and mitral disease. Every type of leucocyte was engaged in phagocytosis of fellow cells. On the warm stage the phagocytes were readily seen to send out processes that would reach around the corpuscles which evidently were incorporated into the body of the phagocyte. There was also, as stated, phagocytosis of leucocytes. The destruction of the cells taken up could be followed and seemed to result on the one hand from processes of solution, due probably to some enzyme,

and, on the other hand, to be due to a large extent to mechanical breaking up of the captured cells. The phagocytosis observed in this case is attributed to the presence in the blood of autohemopsonins.—*Journal Amer. Med. Assn.*

AN IMPROVED ALUMINUM.—The high expectations aroused by the extraction of the metal aluminum from its ores on a commercial scale have never been realized, on account of its softness and other unfavorable qualities. These may be overcome, it is now claimed, by alloying it with magnesium. An alloy of this kind, to which the name of "magnalium" has been given, is now manufactured in Germany, and its makers believe that its use will shortly supersede that of pure aluminum. Some of its advantageous qualities are thus set forth in an article contributed to *Machinery* (New York, July). Says the writer:

"Magnalium, like pure aluminum, can be cast in a liquid condition. The castings can be machined about the same as brass. The machined surfaces are of a mirror-like smoothness and silvery color. Perfect screw-threads can easily be cut in the metal, and bored holes can be made smooth and true. Filing it results in fine, regular, clean-cut surfaces, without tearing up the metal or clogging up the file as does aluminum, and the action is accompanied by the usual typical sound which is heard when filing. Only rough or medium fine files can be used on aluminum, preventing, of course, any exact work, while magnalium will allow the use of even the finest kind of files.

"Magnalium can be cast by any ordinary foundryman, the only precaution necessary being the use of *clean* graphite crucibles, and care must be taken not to increase the temperature too far above the melting point (1,185 to 1,250° F.), as this weakens the metal. If cast in an iron chill the tensile strength is greatly increased and is at a maximum if the chill is water-cooled. . . . . .

"Another advantage of magnalium is that it is extremely close-grained, so that the polishing can be done without previous treatment. Furthermore, in lathe work the tool speed can be twice as great as with aluminum, thus making a saving in labor. Transparent or colored lacquers can be readily applied; polishing, etching, engraving, etc., can be easily done.

"Pure aluminum, being soft, can be cut with a knife like zinc or lead, while magnalium is hard. Some magnalium alloys, however, are very ductile and can be forged, rolled, drawn, etc., as intimated in the foregoing, sharing all advantages of aluminum in this direction. Annealed magnalium 'Z' is so ductile that it can be rolled or beaten like silver. The elasticity of cast or annealed magnalium is small, but in the forged, hard-rolled or drawn material it is much greater. It attains and maintains a high polish and shows excellent resistance to atmospheric conditions. The color of magnalium is silvery white in contrast to the grayish aluminum. Besides all this, magnalium has the advantage that its specific gravity is less than that of aluminum."

Magnalium, the writer goes on to say, has no odor, resists oxidation

better than aluminum or any other light metals, and is almost unaffected by dampness, ammonia, carbonic acid, sulfureted hydrogen, and most organic acids. Saltpeter or sulphuric acid will act on it slowly, and strong alkaline solutions will affect it more rapidly. Salt water attacks it slightly, and where exposed to sea-water the metal should be lacquered to protect it. We read further:

"Magnalium is a very ductile metal, and in this respect is only surpassed by gold, silver, platinum and copper. . . . . Perfectly smooth wire as fine as silk threads has been made with astonishing tensile strength. . . .

"Magnalium is remarkable, inasmuch as that it can be tooled at high speed, about like steel. Screw-threads of length can be easily and cleanly cut. The tools have to be very sharp and the surfaces (both metal and tools) must be kept lubricated with either kerosene, turpentine, paraffin, benzin, vaselin, soap-water, or even clear cold water. Excellent surfaces will result and perfect screw-threads or holes will be obtained. To cut magnalium, a fine-toothed saw, lubricated with kerosene, is recommended. Magnalium can be punched, drop forged, and pressed without any difficulty—about the same as silver, brass, or steel plate—provided that it has been well annealed.

"Weight for weight, magnalium is stronger than Siemens-Martin steel with two per cent aluminum alloy. This steel has an ultimate tensile strength of about 114,000 pounds per square inch. Magnalium 'Z' is rated at 52,200 pounds per square inch. Dividing each by its specific gravity yields 14,400 and 20,800, or nearly 50 per cent advantage of strength for the same weight in favor of magnalium. The value of the new alloy for aeroplanes, automobiles, army equipment, and many other uses in which cost is not so important as lightness, is quite apparent. The price per pound is about two times that of aluminum."—*Literary Digest.*

Treatment of Passive Hyperemia or Acute Partial Non-septic Pulpitis.—Various authors claim to have first suggested to the profession a very efficacious mixture, the component parts of which are stated below, with their slightly different variations. In an article on "The Essential Oils: Their Value and Use in Dentistry," published in Vol. liv, 1900, of the *Dental Register,* Dr. Hermann Printz writes in part: "Thymol, triturated with camphor, menthol or chloral, in its antiseptic action is almost equal to phenol, and in some respects even better. It is not as caustic as the former. As it is more destructive of putrefactive substances and more persistent in its action, it at once recommends itself as a useful agent for treating putrescent root-canals. A mixture of equal parts of liquefied phenol and thymol is superior to phenol alone and far superior to any of the essential oils. Thymol is very penetrating. Combined with other agents, it has been used by Paquet with great success for the preservation of anatomic specimens; and its superior germicidal power has been recently sufficiently demonstrated by the British govern-

ment in India in the treatemnt of the bubonic plague. Its great obtundent and astringent qualities make it a reliable dressing for inflamed pulps, as recommended by Miller years ago. It is curious to note that this agent, in spite of its superiority in many ways over the other essential oils, is comparatively little used by American dentists, while its established value is recognized by the profession in Europe." A year or two later Dr. Prinz recommended the following formula:

℞ Phenol cryst.,
Thymol 3ij
Camphor .....aa. 3j

Melt together by gently heating in a dry test tube.

Dr. E. C. Kirk, in the *Dental Cosmos* for July, 1906, writes, under "Thymophen:" "Equal parts by weight of crystallized phenol and thymol crystals rubbed together in a mortar or combined by gentle heat in a beaker or porcelain dish results in a fluid of oily consistence, similar in physical characteristics to the well-known campho-phènique. It is without escharotic properties, does not coagulate the cuticle when applied topically, and has high germicidal efficiency. The peculiar value of thymol in the treatment of exposed pulps, even when superficially infected, is well known, and has been the subject of scientific study as well as of practical observation for several years. Solutions of thymol have not heretofore been of much utility in dental practice, owing to the lack of a suitable menstruum; hence the virtues of thymol as a root-canal dressing have not been as practically available as they should be. The combination here recommended, and which the writer has taken the liberty of designating as thymophen, is an ideal medicament for use as a canal dressing, taking the place of campho-phénique or the essential oils, because of its diffusibility, its sedative, non-irritant and superior germicidal properties. A large clinical use of the preparation is the writer's warrant for strongly recommending it to the dental profession." Recently Dr. W. H. G. Logan in the *Dental Review* recommends a mixture which he says was presented to the profession by Dr. J. P. Buckley and termed "modified phenol." Its component parts are:

℞ Menthol 3j
Thymol 3ij
Phenolis .....q. s. ad ft. 3iij

M.—Heat the phenol and slowly add the menthol and thymol.—*Dental Cosmos.*

[Thymol has a peculiar but favorable action on animal tissue and is deserving of a prominent place in dental therapeutics.—Editor, DIGEST.]